1990 U.S. INFORMATION SERVICES INDUSTRY

INPUT

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Abstract

INPUT's annual *U.S. Information Services Industry Report* is a concise look at the trends, issues and structure of a key element of the U.S. economy. In 1990, as we enter the new decade, this industry will reach $100 billion in size for the first time.

In its 1990 report, INPUT identifies further changes in the structure of the market with the creation of the systems operations delivery mode. As was recognized in 1987 with the systems integration delivery mode or market, the growth being experienced brings with it greater market complexity.

This report provides an assessment of each of the delivery modes that make up the information services industry, an assessment of the overall market, and an initial projection for the first half of the new decade.

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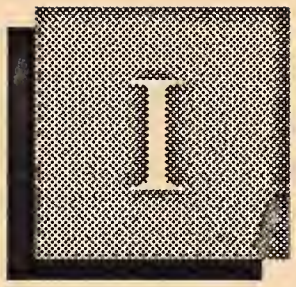
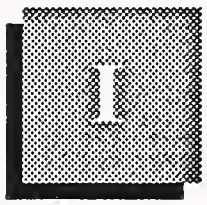


Introduction



Introduction

A

Purpose

This report, *The U.S. Information Services Industry, 1990*, is INPUT's annual assessment of the U.S. information services industry. The report is designed for industry managers, financial analysts and business executives who need to understand the shape and direction of this key sector of the U.S. economy. For 15 years, INPUT has tracked and analyzed the information services area for those who need to gain a full understanding of the size, growth trends, and key issues of this rapidly changing industry.

B

Scope

This report reviews and analyzes the information services marketplace for the industry as a whole and for each of the major segments. Included in this report are:

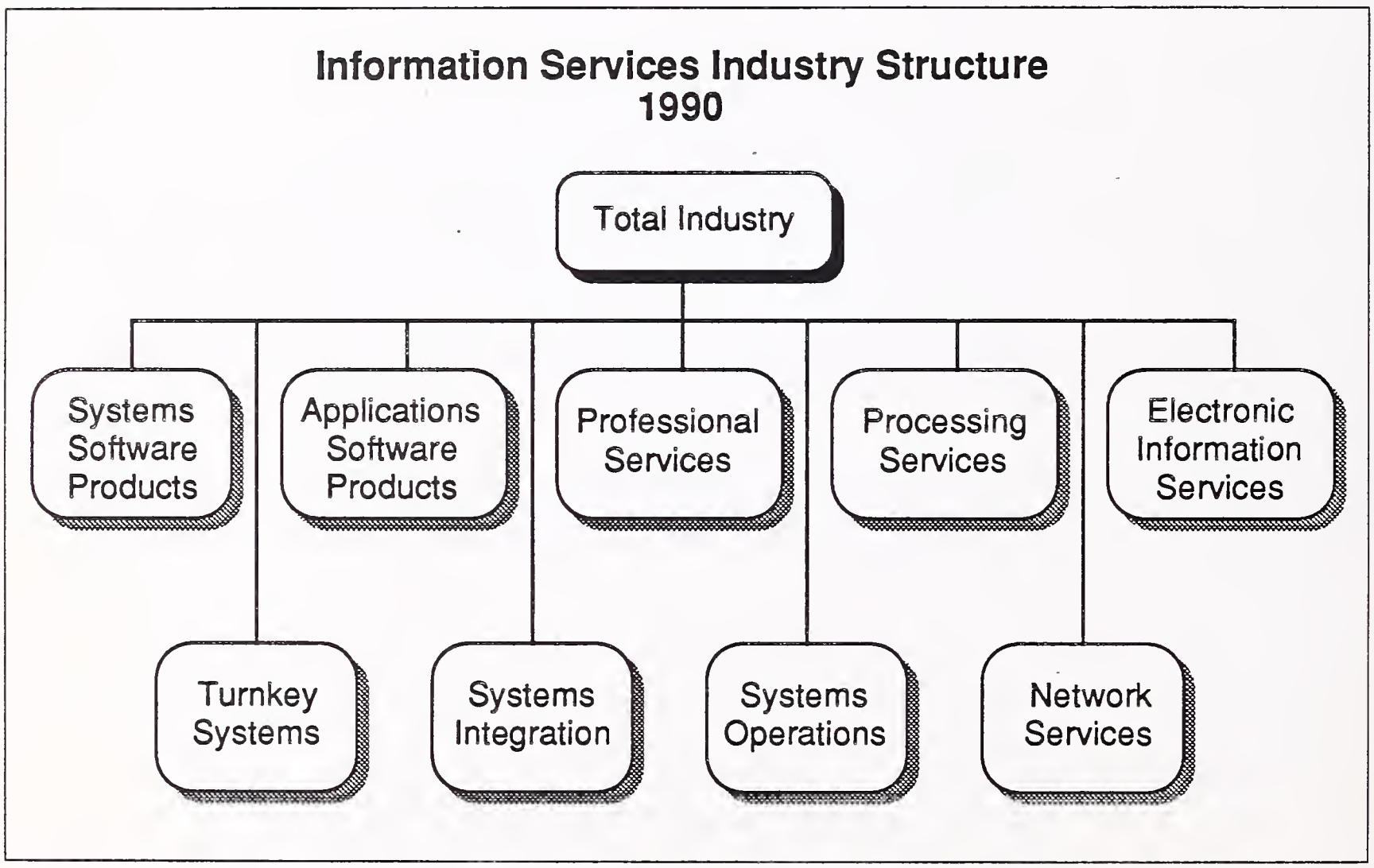
- Descriptions of the issues, trends, and events driving these markets
- Preliminary five-year forecasts of the markets and a description of the forces that drive or inhibit growth
- Discussion of leading vendors and their activities
- A summary of public information services vendor performance

Exhibit I-1 delineates the information services industry that is tracked and analyzed by INPUT. There are nine major segments that INPUT currently groups into seven delivery modes. Each year, INPUT reassesses the structure of the information services industry and, where changes warrant, revises the structure.

- The seven current delivery modes are listed below and defined in Appendix A. Each delivery mode is specifically addressed in a chapter of this report.

  - Software Products (applications and systems software products)
  - Turnkey Systems
  - Professional Services
  - Systems Integration
  - Systems Operations
  - Processing Services
  - Network Services (including Electronic Information Systems)

EXHIBIT I-1



- In 1987 INPUT revised the industry structure when it created the systems integration delivery mode, which had previously been part of professional services. The separation of systems integration was in recognition of a change in the buying patterns of large commercial organizations, which started to turn to a single vendor to design, build, implement and manage large systems projects.

- Systems operations is a new delivery mode, first recognized in 1989. It was created by taking the systems operations submode out of both the processing services and professional services delivery modes. This change is due to the growing trend for organizations to hire vendors to operate entire data centers and manage entire systems installations.

Chapter II of this report provides an analysis of the entire U.S information services market. Chapters III through IX address each of the delivery modes. Appendix A provides definitions used by INPUT in its assessment of the information services industry.

C

Methodology

As an independent market research company, INPUT conducts its own research, interviewing vendors and users on an ongoing basis. INPUT's clients include the leading providers of information services in the U.S. and Europe.

The market size and forecast data for each delivery mode are based on INPUT's analysis and include only U.S. revenues.

- The market size estimates are based on non-captive revenue of industry vendors.

- The market forecasts are specified based on a compound average growth rate (CAGR) for the five years from 1990 to 1995. All forecasts included in this report are *preliminary* and may differ from the forecasts published in the final 1990 individual market reports listed in section D of this chapter.

Data on public companies was obtained from INPUT's Vendor Financial Watch (VFW), which tracks the quarterly performance of public information services companies.

- The public companies have been classified according to the mode of service from which they derive the largest proportion of their U.S. noncaptive information services revenue.

- Company data are obtained from annual reports, 10-K reports, and other published sources, supplemented by INPUT estimates when data are not yet available.

- Financial data in the VFW include each vendor's total worldwide revenue and net income, reported on a calendar-year basis. Comparisons on performance are provided for 1989 versus 1988.

Interim results for the first six months of 1990 versus the first six months of 1989 are also provided for each group (or delivery mode) of vendors.

D

Related INPUT Reports

The following reports by INPUT provide more in-depth analysis of each of the major segments of the U.S. information systems industry.

- *U.S. Processing Services Market, 1990-1995*
- *U.S. Network Services Market, 1990-1995*
- *U.S. Professional Services Market, 1990-1995*
- *U.S. Software Products Market, 1990-1995*
- *U.S. Systems Integration Market, 1990-1995*
- *U.S. Systems Operation Market, 1990-1995*
- *U.S. Turnkey Systems Market, 1990-1995*
- *The EDI Market 1990-1995: Forecast, Implementations, Trends*

INPUT also tracks the European information services industry. Related INPUT reports include:

- *European Market Forecast & Analysis Summary, 1990-1995*
- *Applications Solutions Market (Europe), 1990-1995*
- *Systems Software Products Market (Europe), 1990-1995*
- *Processing Services Market (Europe), 1990-1995*
- *Professional Services Market (Europe), 1990-1995*

II

Information Services Industry

II

Information Services Industry

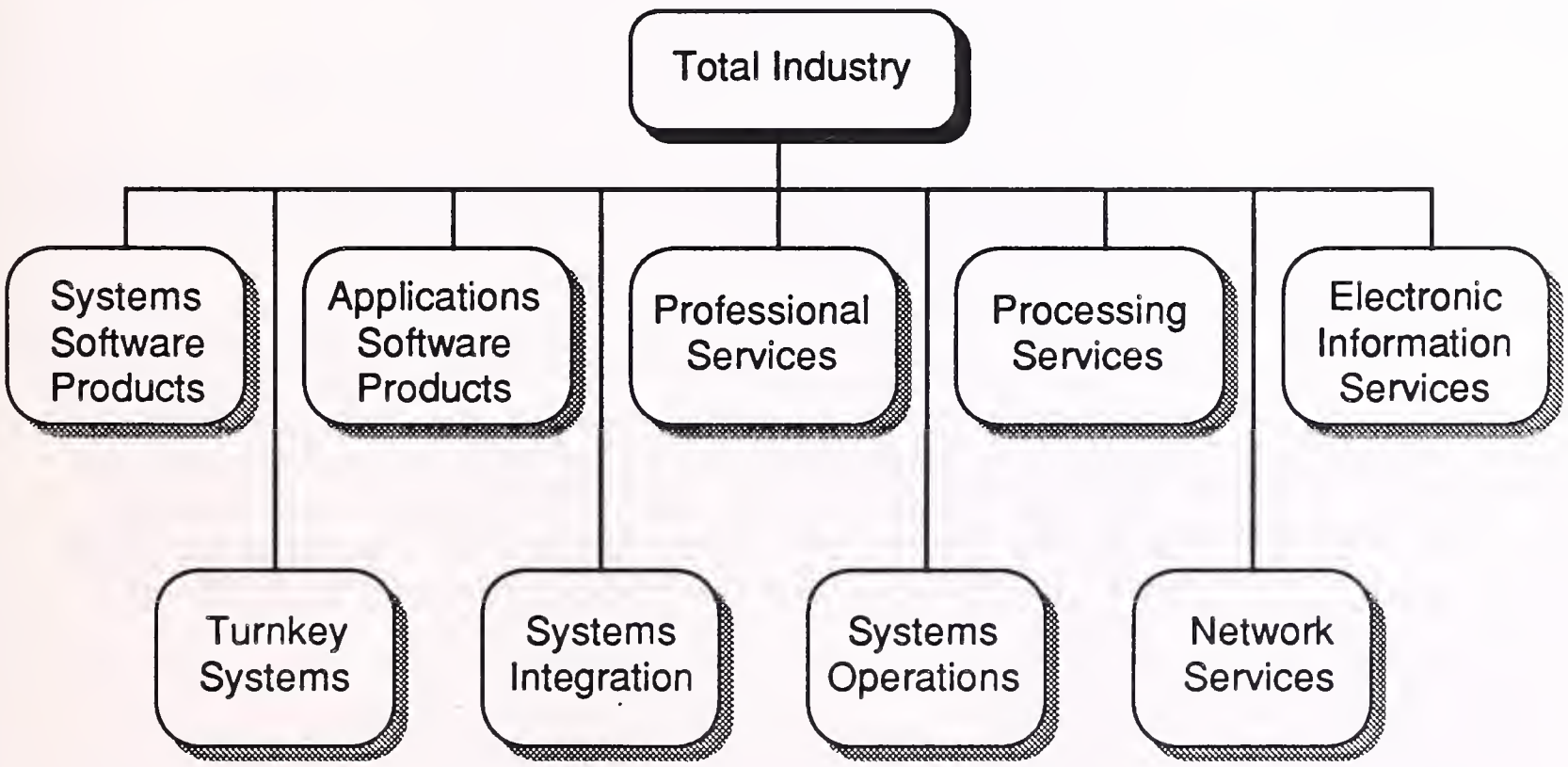
A

Information Services Industry Structure

As shown in Exhibit II-1, the information services industry includes nine main segments or delivery modes, each of which is defined in Appendix A - Definitions. Each of these delivery modes involves the development and/or operation of computers, communications or application systems for customers.

EXHIBIT II-1

Information Services Industry Structure
1990



- At one end of the spectrum is the system software products sector, which is primarily concerned with the use of basic resources (computers, communication and people).

- At the other end of the spectrum is the electronic information services sector, which is primarily concerned with the provision of information to customers, and is perhaps more akin to the publishing industry than the computer industry.

Within each mode of delivery, subcategories are examined by INPUT along several axes: software products (systems and applications) are analyzed by size of platform (computer equipment); system integration and turnkey systems are broken down by component (equipment, software products, professional services, other); professional, processing and network services are broken down by the type of service provided. For example the processing services is split between transaction and utility processing services.

Another method of examining the information services industry is by type of user. INPUT breaks the market down into 16 specific industries, based on SIC codes, and cross-industry sectors. These sectors are defined in Appendix A - Definitions. The industry and cross-industry sector analyses are not part of this report, but are available separately from INPUT.

B

U.S. Information Services Industry Market Growth

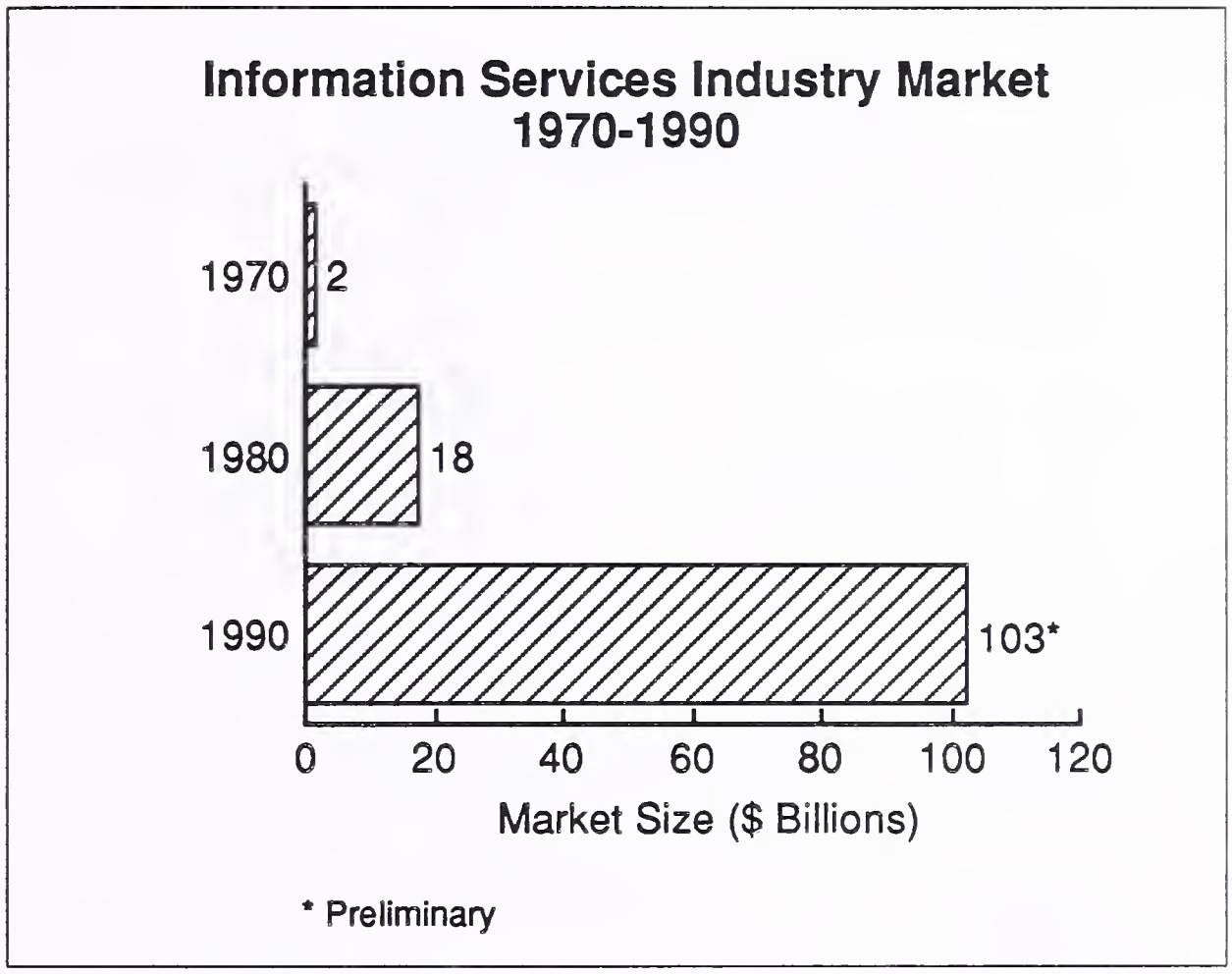
Since INPUT first examined this industry in 1975, the market has grown by a factor of 20. This growth has created wealth and strength in the computer and communications industry.

- It has done this by providing solutions to customers' needs.

- To use current terminology, the information services business is the *outsourcing* of the information system (IS) development and operations activities of organizations.

As shown in Exhibit II-2, the market accelerated rapidly in the 1970s and continued to experience rapid growth into the early 1980s. Rapid growth in the early 1980s was sustained to a large degree by the explosive growth of the microcomputer software products market. There was a "recessional" slowdown in the mid-1980s followed by strong growth during 1987-1988. In 1989 there began to be a tailing off of the growth rate, a trend which will continue in some sectors into the 1990s.

EXHIBIT II-2



In terms of development, the industry in maturing; in some segments it has reached the top of the "S" curve. Thus, growth rates are declining overall, although incremental growth continues to increase market size.

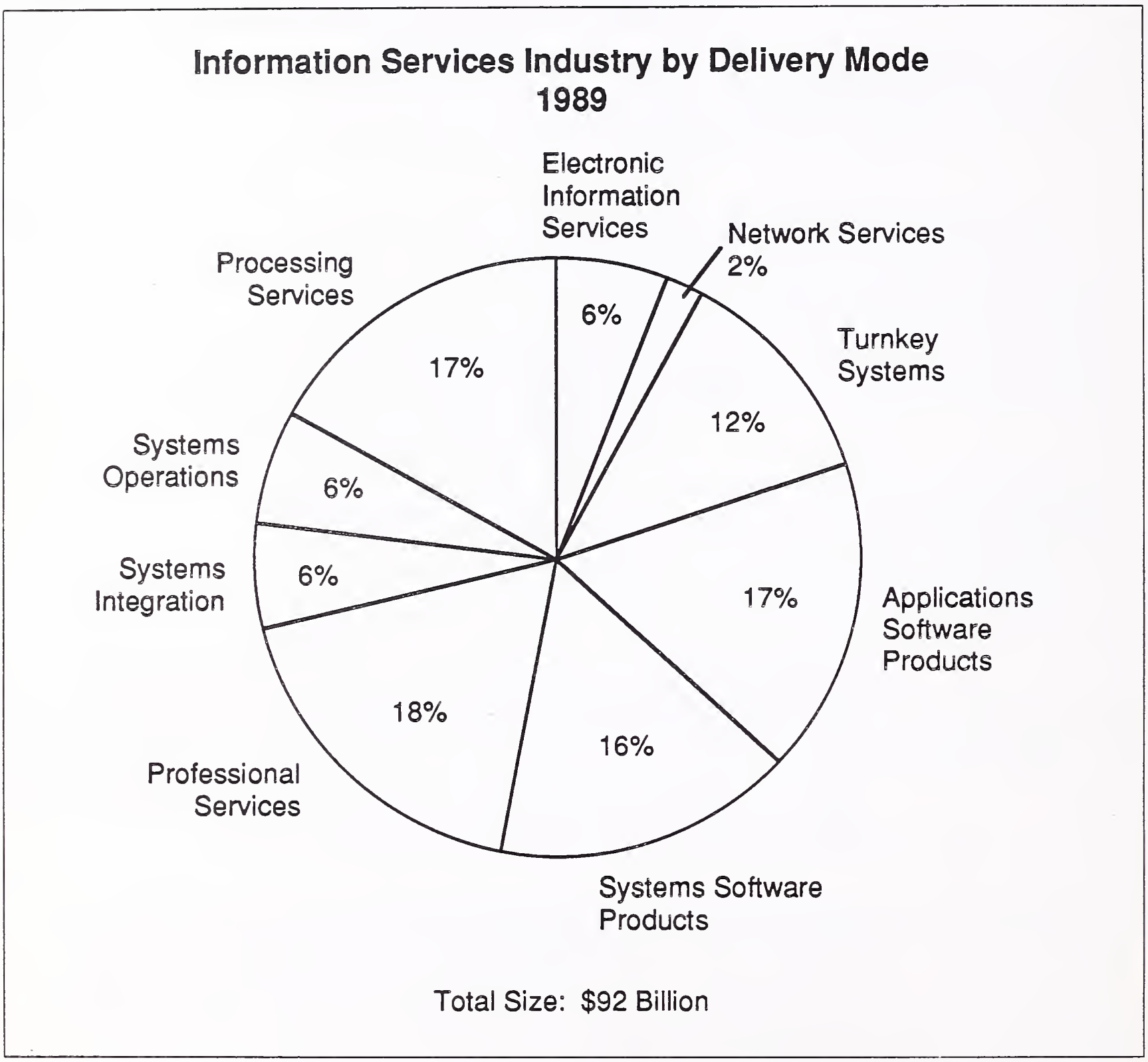
There are, however, several factors that could cause the industry to accelerate its growth substantially in the 1990s. These are identified below and discussed in other INPUT market forecast reports.

As shown in Exhibit II-3, development-oriented modes of delivery (professional services, applications software products, system integration and turnkey systems) account for 53% of the total market, while operations-oriented modes of delivery (processing services, system operations and network services) account for less than 30%, with the remainder in system software products.

- The development-oriented modes are exposed to economic and general business growth trends, which are currently at low levels. These modes are projected to see slowing growth rates in the near- to mid-term.

- The operations-oriented segments, however, are much less subject to the impact of a recession than the development-oriented segments. In addition, the move towards outsourcing (discussed below) could dramatically impact the growth rates for these modes. Thus the market share of the operations segment may increase substantially in the 1990s.

EXHIBIT II-3



In looking at the industry by type of buyer, the major segments have stayed constant through much of the 1980s; however, U.S. federal government expenditures will grow much more slowly than in the 1980s. Indeed, certain government information services markets may actually decline in size in the early 1990s. As shown in Exhibit II-4, the U.S. federal government is the third largest vertical market sector and, in spite of slower growth, will remain so through the forecast period.

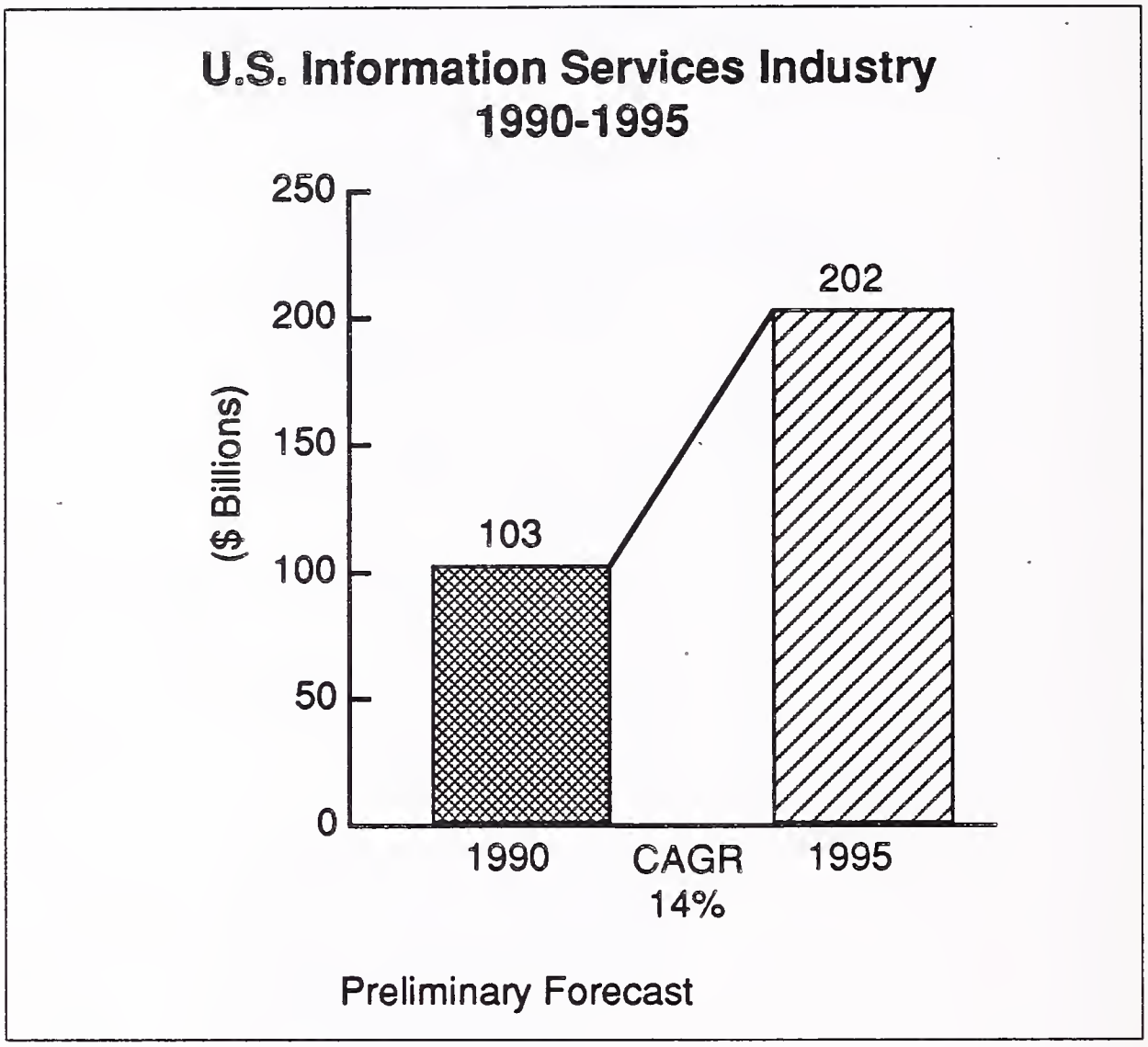
EXHIBIT II-4

Information Services Industry by Vertical Sector, 1989

Market Sector	1989 Market Share (Percent)
Industry Sectors	
Banking and Finance	11
Discrete Manufacturing	10
Federal Government	9
Process Manufacturing	5
Medical	4
State and Local Government	4
Insurance	4
Transportation	3
Services	2
Telecommunications	2
Other Industry Sectors	8
Cross-Industry Sectors	
Accounting and Finance	4
Office Systems	3
Human Resources and Payroll	3
Planning and Analysis	3
Other Cross-Industry Sectors	3
Other Sectors	
Systems Software Products	16
Cross-Industry Data Bases	3
Other	3
Total	100

As shown in Exhibit II-5, the overall growth rate forecasted for 1990 to 1995 has been preliminarily estimated at 14%, subject to completion of INPUT's 1990 forecasting process.

EXHIBIT II-5



- Factors that could negatively impact the forecast are slow or negative economic growth, replacement of software and services with hardware, lack of capital for investment, fragmented and weak vendor groupings, a static market, etc.

- Positive factors include the general lack of skilled personnel, acceptance of outsourcing of IS activities, stronger vendor positioning, acceleration in buyer commitment to newer technologies such as image, voice and cooperative processing communication, increases in government IS spending, etc.

C

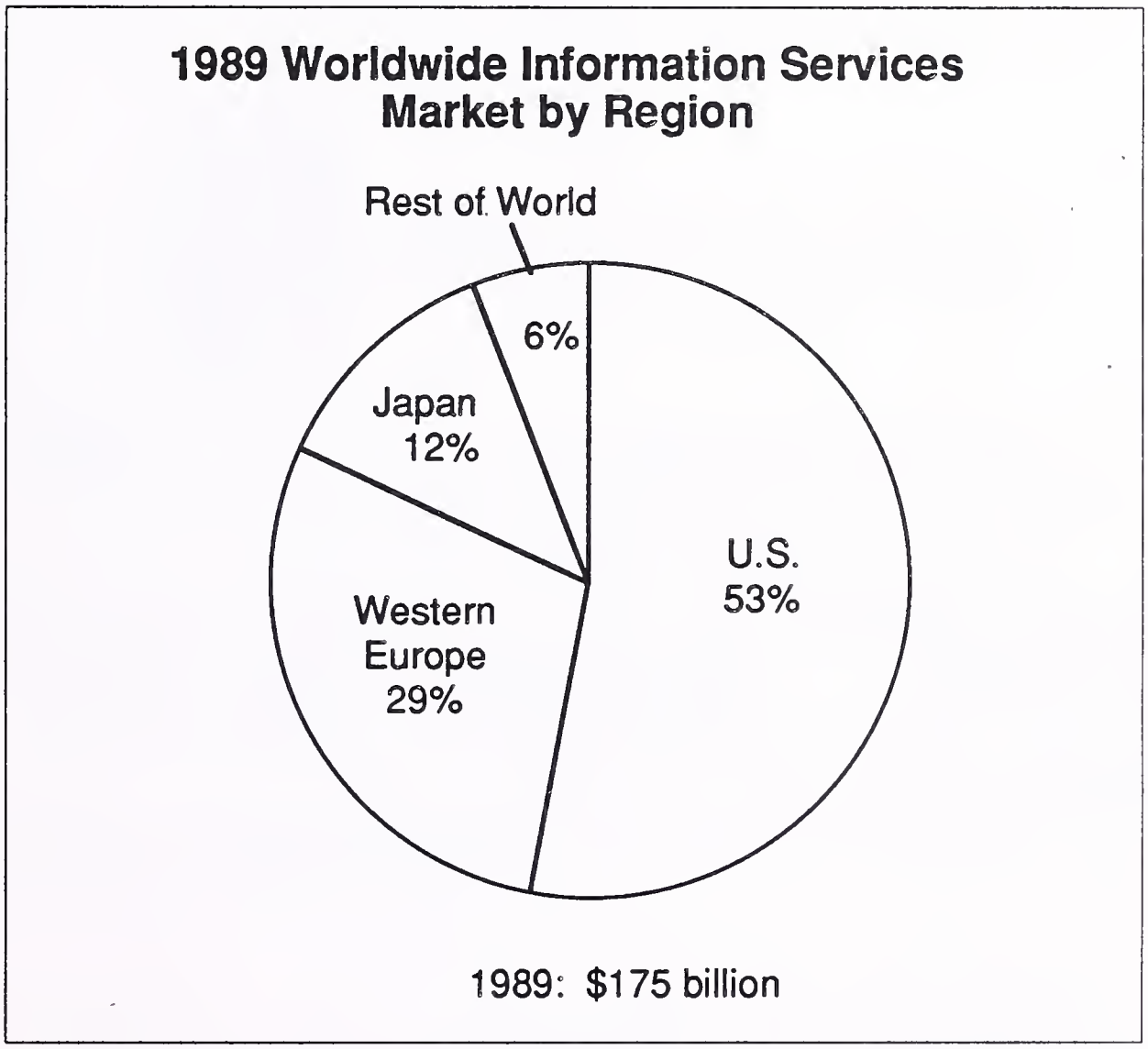
Stronger Information Services Markets

Some information services products have enjoyed global markets for many years; for example, microcomputer application software products such as spreadsheets, relational data base management systems, etc. However, most markets have developed geographically with strong country vendors. There have been few truly multinational and fewer international vendors.

During the 1990s this will change, particularly as customers increasingly require support and service on a worldwide basis. Already, Japanese information services companies are moving into U.S and European markets and European companies are consolidating to address the integrated market of the mid-1990s.

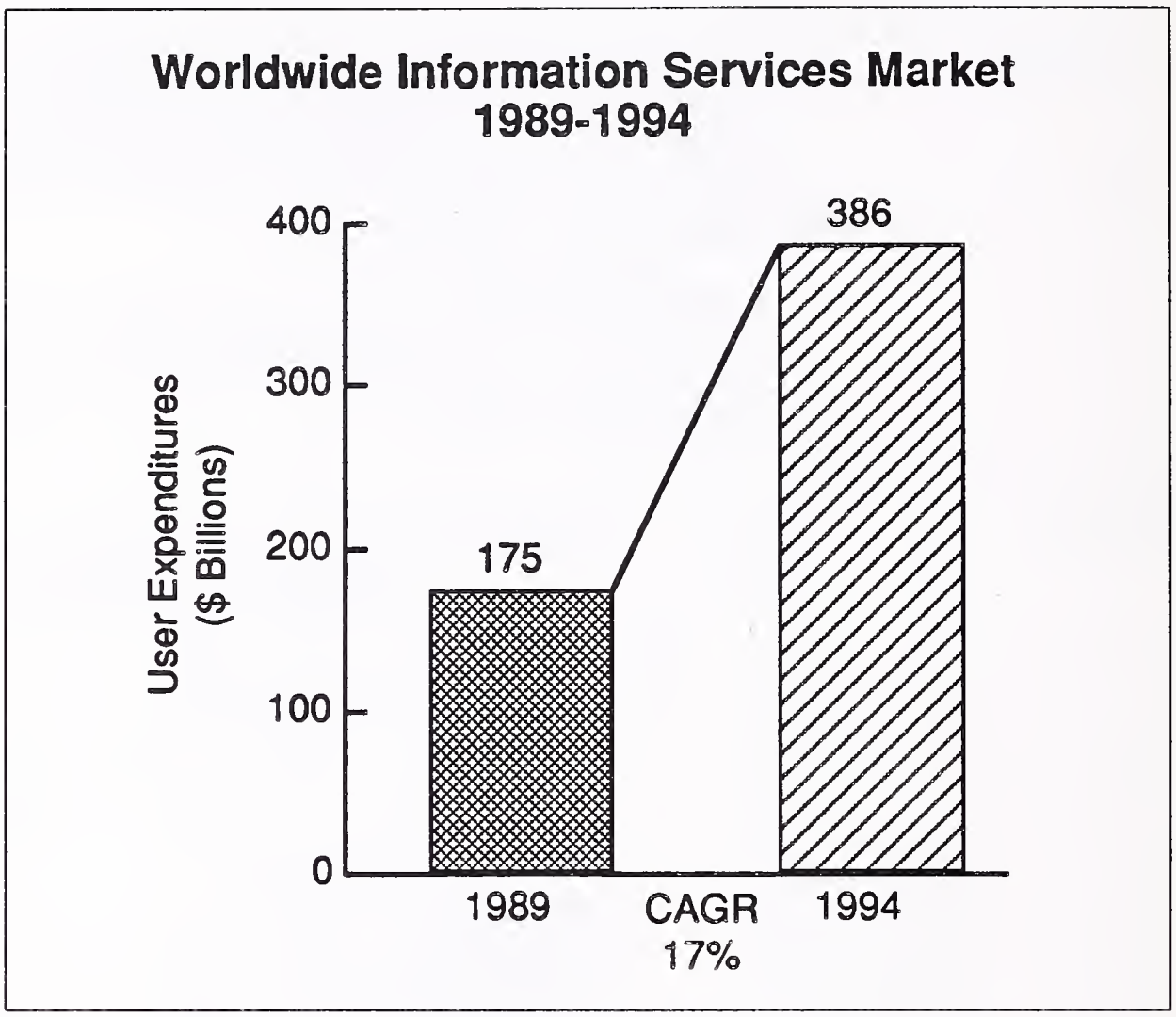
Although the U.S. is the largest individual country market, as shown in Exhibit II-6, it now has the slowest growth rate of the major markets. One reason is that the market penetration is already much higher than within other countries.

EXHIBIT II-6



INPUT research (see the report *Worldwide Information Services Market, 1989-1994*) projects that worldwide markets for information services will reach almost $400 billion by 1994. As shown in Exhibit II-7, the worldwide market will experience a compound average growth rate (CAGR) of 17%, as compared to a 14% CAGR in the U.S. By 1995, the U.S. market will drop to approximately 45% of the worldwide market, compared to 53% in 1989.

EXHIBIT II-7



D

Worldwide Information Services Market Potential

The current penetration of total information system expenditures (including salaries, equipment purchases, operating costs, etc.) worldwide is estimated to be 20%, as is shown in Exhibit II-8.

EXHIBIT II-8

Information Services Market Penetration Worldwide

	Expenditures ($ Billions)	
	1989	1994
Information Systems	840	1,420
Information Services*	170	380
Penetration	20%	27%

* Less electronic information services

- Most IS development and operational activities are still performed in-house.

- The penetration by information services vendors may even be less, due to the uncertainty about the extent of user expenditures, in particular for microcomputer use, since much of the related cost is simply not captured.

INPUT predicts that this could change significantly in the 1990s as organizations review their historic approach to IS. It should be remembered that in many other areas of business the initial tendency to perform operations (manufacturing, distribution, etc.) in-house has been replaced by use of external sources, as economies of scale and rationalization of business operations become necessary.

The penetration forecasted by INPUT, of less than 30% by 1994, is conservative. The major factor that can affect the penetration is the extent to which organizations will share the management of their IS resource with vendors. This is the focus of outsourcing.

E

Outsourcing

The information in this section has been taken from INPUT's recent outsourcing conference in July, 1990, and its report, *Information Systems and Outsourcing—A Strategic Assessment.* The conference and report are based, in part, on research for INPUT's Systems Operations and Systems Integration programs.

The corporate information systems function has always outsourced some aspects of its product and service requirements. First, hardware and systems software were acquired because only a vendor could afford to develop them. Then IS began to outsource application software and specialized processing services, capabilities that had been and still could be provided internally or *insourced.*

Today, IS and general management are outsourcing, in some instances, almost the entire information systems process and function. The questions are: "What is different in 1990 that is causing management to cast its use of information technology into the hands of a vendor, and just how should outsourcing be viewed in this new decade?"

1. Outsourcing—A Working Definition

INPUT views *outsourcing* as the opposite of *insourcing*. Anything that IS has considered feasible to insource (data center operations, applications development, applications maintenance, network management, training, etc.) and has traditionally done itself should now be viewed as possible to outsource. Outsourcing is defined in Exhibit II-9.

EXHIBIT II-9

Outsourcing Definition

Outsourcing is the contracting of information systems (IS) functions to external vendors.

The framework for outsourcing comes from the recent trends toward systems integration and systems operations.

- Outsourcing, as represented by systems integration, reflects the buyer's recognition that it is often better to purchase the solution, not just the components. As a company would contract to have a new plant built, now it also contracts for all facets of the factory control systems for that plant. Instead of buying the hardware, software and integration effort in pieces from a number of vendors, it turns to a single vendor.

- Outsourcing as represented by systems operations reflects the buyer's desire to access a data processing utility or have its existing data center operated and managed by a vendor, thus freeing the buyer to concentrate on more critical facets of its information systems program.

  - The challenge of running a data center is demanding more financial, personnel and technical resources, which is changing the economic equation.

  - Many large organizations are consolidating data centers into very large processing utilities to take advantage of data center automation and to meet the demands of network integration—yet they find the challenge outstrips the skills of their staffs.

  - Meeting the demands for processing service levels is diverting IS management from the real priorities of solving operating problems and fulfilling information needs.

Many progressive companies are finding that vendors are now equipped to do broadbased information systems implementation and management more effectively than internal staffs—that is, at a lower cost and with better performance over time.

Outsourcing is a phase in the evolution of the information services industry that greatly expands the opportunities for progressive IS executives and information services vendors.

2. Driving Forces

The decade of the 1990s promises to be even more challenging than the 1980s in terms of business success in the use of information technology. The pressures to respond to change, focus on areas of greatest potential, integrate through alliances and deal with a global market can all be impacted by information technology. Exhibit II-10 positions the critical driving forces of the early 1990s at the industry, organization and information systems levels.

EXHIBIT II-10

Information Technology Driving Forces

Industry	Organization	Information Systems
Globalization	International opportunities and competition	International processing requirements
Specialization	Core business and functions	Strategic systems
Pace of change	Structural change	Rapid response and deployment
Integration	Intra-organizational relationships	Intra- and inter-organizational systems

- Globalization will drive organizations to seek out and compete for international opportunities while competing with companies on an international basis. The result for IS is that all information networks will have to be considered from an international viewpoint.

- The 1980s taught most organizations that success comes from sticking to what they know best. This lesson has led companies to increase focus on their core business and within that business, on the core functions that provide the most added value to the organization. The result has been a strong drive to create strategic systems in the late 1980s—a drive that continues into the 1990s.

- The accelerating pace of change is a third broad driving force impacting organizations and their IS functions. Rapid response and the flexibility to quickly adjust to change form the basis for success. Pace of change is represented by the extensive structural change going on within organizations, from downsizing to organizational flattening. IS must place rapid response high on its list of performance criteria.

- To succeed in today's business world, integration—both intra- and interorganizational—has become paramount. IS support of business alliances of all types, interorganizational systems based on EDI, and the explosive growth in the use of E-mail are but three examples of how integration of the information network is fundamental to survival in the 1990s.

3. Outsourcing Decision Factors

A variety of factors are driving a greater number of organizations to make the IS outsourcing decision. Exhibit II-11 shows two perspectives on the decision factors related to outsourcing: that of the organization or business, and that of information systems.

Many of the major outsourcing decisions that have been chronicled in the industry, and many others identified by INPUT, can be tracked directly to a major shift in the direction of the business. Mergers, acquisitions, LBOs and restructuring all lead senior management to ask for quick response and more cost-effective IS operation. When senior management participates in the outsourcing decision, the process becomes very business-driven, as represented by factors in the left-hand column of Exhibit II-11.

EXHIBIT II-11

Outsourcing Decision Factors
Organization versus Information Systems

Organization/ Business	Information Systems
• Cost	Scheduling
• Merger/acquisition	Software
• Postponement	Personnel
• New directions	Motivation
• Focus/time	Pride
• Response time	Response time
• Quality sooner	Quality

- A number of the organizations that are looking to platform companies for data center outsourcing are seeking ways to lower investments and find cost savings in the period immediately following an LBO or divestiture.

- A principal element in the growing use of systems integration is response time. Today's complex systems take significant blocks of development resources that are best outsourced—especially when they also require technical skills not present within the current IS staff. Operating management knows what it wants and when it is needed; the decision to outsource is then a result of business needs, not the personal preferences of the IS experts.

When the decision to outsource falls to IS, it often becomes entangled in the internal pride and hereditary issues of a support organization that is increasingly in the limelight of today's progressive organization. The result is that most IS management still looks at outsourcing, at least initially, with a negative attitude. IS managers often believe outsourcing will lead to a loss of direct control—new organizational and personal challenges that the IS manager, still a technician at heart, finds difficult to address—and to long-term commitments at a time when management is asking for increased flexibility and speed of response.

These beliefs lead to a set of decision factors like those in the right-hand column of Exhibit II-11. The challenge for IS management is to transcend this list, shifting away from a parochial IS viewpoint and embracing a set of decision criteria that more directly parallels that of the organization as a whole.

4. Market Evolution

As the 1990s begin, we are witnessing a maturing of the information systems community, of both vendors and buyers. As Exhibit II-12 depicts, the vendor community has provided and the IS function has bought ever more complex and expansive services. In the simplest of terms, outsourcing is the direct result of the following:

- The capabilities of today's information technology often exceed the capabilities of the internal IS function to take full advantage of the alternatives and opportunities available.

- The complexities of today's business require solutions and responses that often preclude the internal IS organization from responding quickly enough, given its existing operational and maintenance responsibilities.

- Some information services vendors have reached a level of maturity that permits them to provide a much more comprehensive set of services. In short, vendors can achieve economies of scale that are unavailable to most users.

EXHIBIT II-12

Evolution of Outsourcing

Type of Product or Service	1960s	1970s	1980s	1990s
Applications Software	Applications Packages		Turnkey Systems	Applications Management
Professional Services	Consulting Contract Programming		Applications Development	Systems Integration
Processing Services	Specific Processing Services		Facilities Management	Systems Operations

These trends were first recognized in the late 1980s with the emergence of the systems integration delivery mode, which marked a significant shift in professional services from consulting, contract programming and application development to vendor responsibility for the entire project from concept to implementation and operation.

In facilities management, the commitments have also expanded, suggesting the change to systems operations. An industry sector previously experiencing slowing growth is seeing new life, and the commitments being made are longer and more comprehensive.

Today's vendor-client relationships are changing significantly, as noted in Exhibit II-13.

EXHIBIT II-13

Outsourcing in the 1990s
What is Different

- Size and length of commitment
- Breadth of responsibility assumed by vendor
- Partnership versus supplier/subcontractor
- Complexity of IT solutions
- Professional services component

- The size and length of commitment is growing along with the breadth of responsibility assumed by the vendor. Systems operations contracts are typically five years in length and often longer. Systems integration projects are all-inclusive, and usually last several years.

- The relationship between client (IS and the operating unit) and vendor is better characterized by the term partnership than by buyer/supplier.

- The complexity of information technology creates new solutions, but has now reached the level where many IS organizations cannot master it all.

- The shift in the makeup of what is bought from information services vendors, which includes an ever-growing professional services component, is the final significant difference. Among the fastest growing software companies are those that have made professional services a critical strategy element.

The sum of these differences is that the vendor is now providing a significant systems management element along with products and services. Whether serving as the prime contractor on a systems integration project or providing full data center and data network services (on-site or remotely), the vendor interface is at the top of the client IS organization and includes operational, tactical and strategic elements.

5. Emerging Opportunities

Exhibit II-14 shows a relationship between the delivery modes used by INPUT to forecast the information services industry and the types of outsourcing relationships that are becoming common between clients and vendors.

- Each of the delivery modes represents products and services purchased by information systems organizations. Those not included in the systems management box do not typically include the partnership commitment of today's outsourcing decision. They are the components of outsourcing decisions.

- Systems integration and systems operations are combinations of basic products and services into new delivery modes which have become separate and distinct from traditional professional services and processing services.

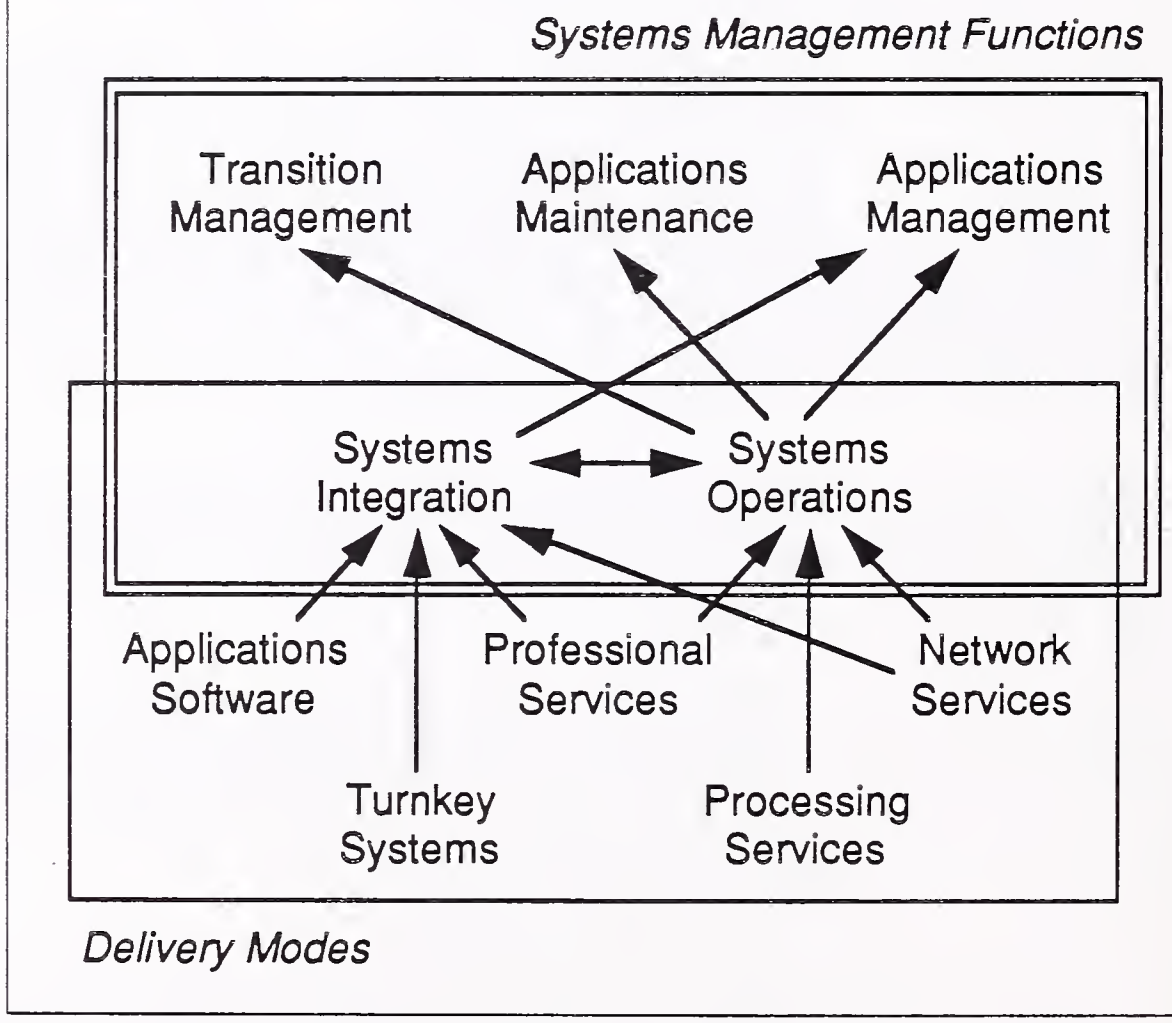
- Applications management is a higher level of systems operations, with the vendor taking on total operations and development support for specific application suites. Today's applications management includes a full systems operations agreement, vendor-supplied application software combined with applications maintenance. It often starts with a systems integration assignment.

- Applications maintenance is an emerging outsourcing opportunity. The maintenance burden of the existing application suite is the greatest inhibitor of information systems progress in the eyes of management. A small but growing set of vendors is proving they can do it better at lower cost using disciplined methodologies, re-engineering tools and entry-level staff with strong management.

- Transition management is another emerging opportunity. Information systems functions are shifting technology, adjusting to mergers and acquisitions, consolidating data centers, and more. These shifts often take three to five years, and offer opportunities for a partnership with the vendor—either managing the old, serving as a systems integrator to install the new, or some combination of both.

EXHIBIT II-14

Outsourcing—Developing Market Opportunities

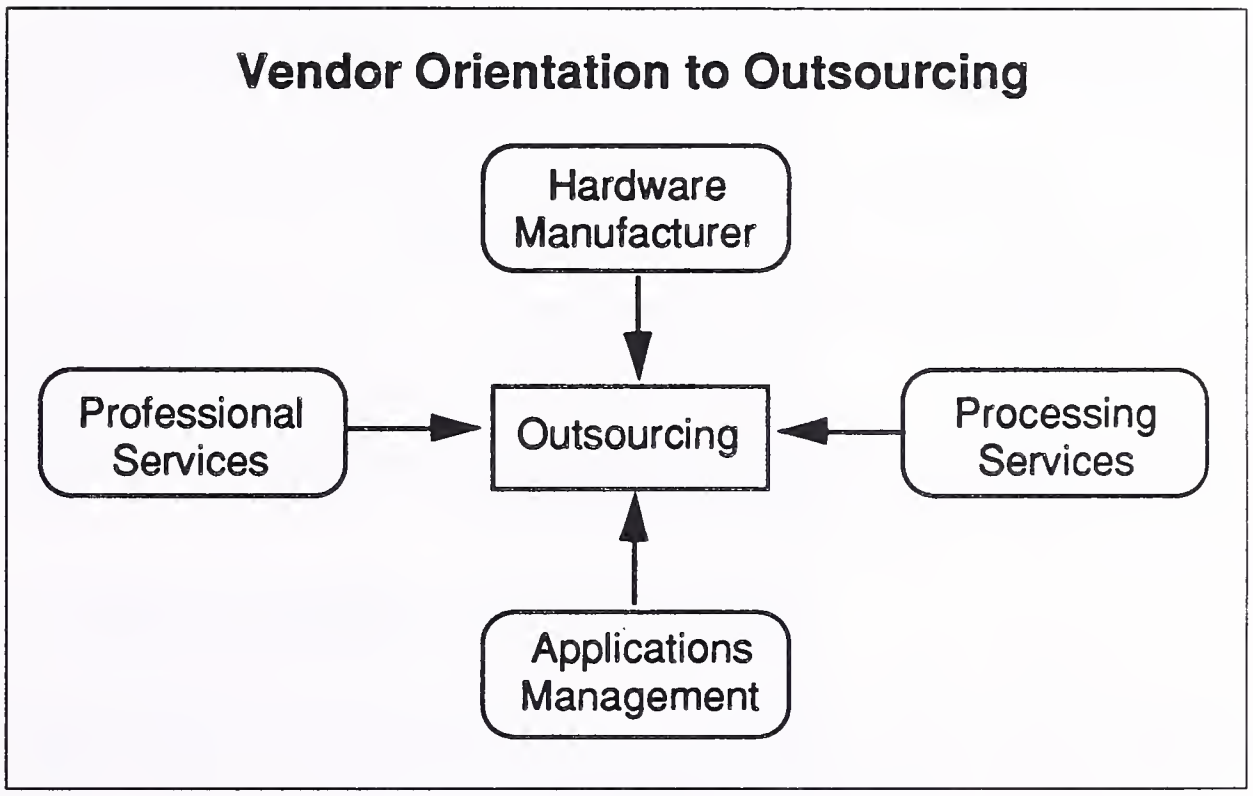


All of the systems management functions in Exhibit II-14 include management as a critical element of the service. It is the management skill brought by the vendor to the partnership that will assure success and permit the user to concentrate on other priorities.

6. Vendor Strategies

The emergence of any trend in the information services industry includes a shift in strategy by existing vendors, the emergence of new vendors, and the creation of additional submarkets. Exhibit II-15 suggests that the heritage of each category of vendor will impact its outsourcing strategy.

EXHIBIT II-15



- The hardware manufacturer brings its historical installed base to the systems integration and systems operation areas. As with IBM, hardware manufacturers' strategies in this area often are a conflict between the progressive vendor grasping new opportunities and the need to avoid adversely impacting established business bases. The result may be a defensive strategy.

- The professional services vendor, while still struggling with the changes required to be a systems integrator, is having to add systems operations to its offerings if it is to form true lasting partnerships with its clients.

- Applications management vendors deal with the complete cycle of application development, operations and maintenance, and often provide the application software. And they must be prepared to maintain the client's own application software as well.

- Processing services vendors are often characterized as platform providers. They either take over and run the client's data center, or shut it down and move it to an off-site multiclient center. Their challenge is to add application support capabilities, either directly or through alliances, so they can respond to clients who want more than systems operations services.

The blossoming of outsourcing as the information services trend of the 1990s is a natural outgrowth of the events of the 1970s and 1980s. The challenges are more complex and the capabilities of the information services vendors more complete. It is only natural that business should be turning to the vendor for expanded help. The test of the 1990s will be how the buyer manages the vendor as it provides these expanded services.

F

Competitive Trends

Trends in competition in the 1990s are demonstrated by the actions of key vendors in the industry.

1. Andersen Consulting

Andersen Consulting has achieved a change in itself and its position in this industry which is unprecedented. First, it is essentially a spinoff of Arthur Andersen & Co. Unlike many other spinoffs, it has established itself as virtually an independent entity. It has dealt with the very difficult ownership issue.

Second, it has positioned itself in the market as one of, if not the top, market leaders through aggressive marketing and production. This is a set of activities that most information services companies have woefully neglected. All information services companies in the 1990s will have to increase their marketing and marketing budgets if they are to be successful. This is not simply to say that advertising budgets must increase; after all, many vendors (e.g. ADP, Microsoft, CA) spend substantial funds on product/service direct advertising and are positioned by such advertisement.

Third, Andersen Consulting has expanded into products and services that are contiguous and in some cases coterminal with basic services: for example, its application development methodology.

Foundation, Andersen's CASE product family, exists to improve productivity in the execution of Andersen's business that is coterminal. On the other hand, Strategic Services (management consulting) and Change Management Services are contiguous areas to its traditional profession services activities.

Both Change Management and Strategic Services are not solely IS-oriented, although individual projects can be so. In terms of market potential, Change Management, which helps organizations through organizational transformations, has a potential growth rate of 40% or more.

However, the most important strategic direction for Andersen Consulting is its attack on the in-house information systems expenditure base. Through system management services it can take over all or part of the application portfolio of an organization, re-engineer and maintain it. As mentioned earlier, this is a huge market opportunity.

Almost as important, Andersen's systems operations unit will take over the management and operation of an organization's computer/communication operation.

Another change symptomatic of the direction of the industry is Andersen's thrust into application software products—not simply as an end in themselves, but as the foundations around which custom systems can be developed. This represents the future of application software development.

Another—by no means final—direction for Andersen is its strong move internationally. It is becoming a true international company with coordination and standards operating across national boundaries.

2. Computer Associates International (CA)

As the largest U.S.-based, independent software products vendor, CA has been a major factor in the consolidation of the systems software products market. Its drive to be the one-stop shop for independent systems software has led to acquisition of many software products and software product companies, as well as the foundation of a strong distribution and sales organization. But the accumulation of companies and products requires assimilation, a process through which it is currently going.

CA is also affected as a systems software products company by slowdowns in the computer equipment market. It can ameliorate this process, as it is doing by continuing to focus on building recurring revenues from software products (long a CA way of doing business) and by diversifying its products base to a variety of platforms.

However, diversification takes time and skills acquisition. Hence the foundation of alliances.

CA also is establishing a position in customers' eyes as more than an emporium of software products by developing an architectural framework for its products sets, another part of its assimilation process.

- As other companies showed during the 1980s, making acquisitions in the early part of year often provides access to capital and sales skills. It is the assimilation and coordination of acquisitions that is difficult. This is where CA has been putting its efforts to form a springboard for future growth.

- It should also be noted that CA has moved strongly into applications solutions at the PC/workstation and larger system levels. It thus has a spectrum of products from the data center through application development to applications themselves. As with Andersen Consulting, this represents the trend in software products.

In addition, CA is adding professional services to provide solutions to its customers. Its professional services target data center management, using its tools as well as developing and implementing applications solutions.

3. Computer Sciences Corporation (CSC)

CSC continues to focus on its "knitting" as Tern Peter would say, in the U.S. federal government business. Although its market is slowing in many respects, there are still major opportunities for growth for vendors that are knowledgeable and aggressive, as CSC has been in its primary market sector.

However, CSC has also moved strongly into commercial professional services and systems integration through acquisitions in the U.S. and Europe. Through The Index Group, it has obtained a very strong IS consulting position. Although this business is small relative to CSC's overall size, it may grow rapidly and, more importantly, lead to large commercial projects.

CSC has divested itself of its interest in Infonet, thus allowing more resources to be focused on its core business.

One of these businesses, the credit business, is somewhat different from others but is a valuable asset that CSC continues to enhance.

4. Electronic Data Systems (EDS)

When EDS was acquired by GM, INPUT that predicted that its competitors would have a year's grace during which EDS would digest the GMC business and then the information services industry would see the re-emergence of an aggressive, much stronger company. This has in fact happened.

The GM portion of EDS' business remains relatively flat, while the non-GM side is now growing very aggressively.

EDS continues to be the industry leader in systems operations (previously called facilities management). However, it is now aiming for very large accounts as well as the medium to large companies it has historically served. Thus, its potential for growth is very high.

EDS will sign an increasing number of $1 billion-plus contracts. For many such very large companies, EDS is the only alternative to in-house operations—with the possible exception of IBM and particular vendors in certain vertical markets.

EDS is strongly industry-oriented in its approach and is adding software products and professional services to flesh out its capabilities. It does not acquire companies' particular products and services, preferring to take part-ownership in order not to overwhelm these smaller companies. This is also an IBM and DEC tactic.

A strong focus of EDS is networks. It uses the GMC Network base to establish very competitive and wide-ranging network services.

The position of EDS vis-a-vis computer suppliers is at a delicate point. Through GM, EDS procures multimillion dollars' worth of equipment each year. This gives it leverage with computer suppliers, which it uses to advantage in the pricing and availability of systems. EDS also has a relationship with Hitachi through its ownership portion in Hitachi Data Systems (HDS).

It remains to be seen how this relationship will play out. It certainly represents one of the areas of great difficulty in the 1990s—that is the nature of the relationship between a services company and an equipment supplier that needs the service company as a partner, yet covets the services company's business.

Another fact of EDS is its strength as a global company. Like IBM, it provides a coordinated, consistent market presence in many countries.

5. IBM

One of the fundamental changes IBM has made in the U.S. is to put its services business, particularly professional services and systems integration, into its field marketing. For a while, systems integration was a centralized activity. Recently, IBM decided that to be a solution company, its business needed to be done at the local level. In a sense, IBM has returned to its roots of 25 years ago. At that time, it had to provide solutions through its field force, since many customers did not have the capability of developing them themselves.

In addition, through its National Services Division (NSD), IBM has entered the systems operations market. This was not done as a major strategic service move by IBM, but as a response to a competitive market situation; in the Eastman Kodak case, as a defense against Amdahl equipment being installed and operated by another vendor. The market response to its services was initially very great. However, INPUT believes IBM has stepped back from its really aggressive thrust into this

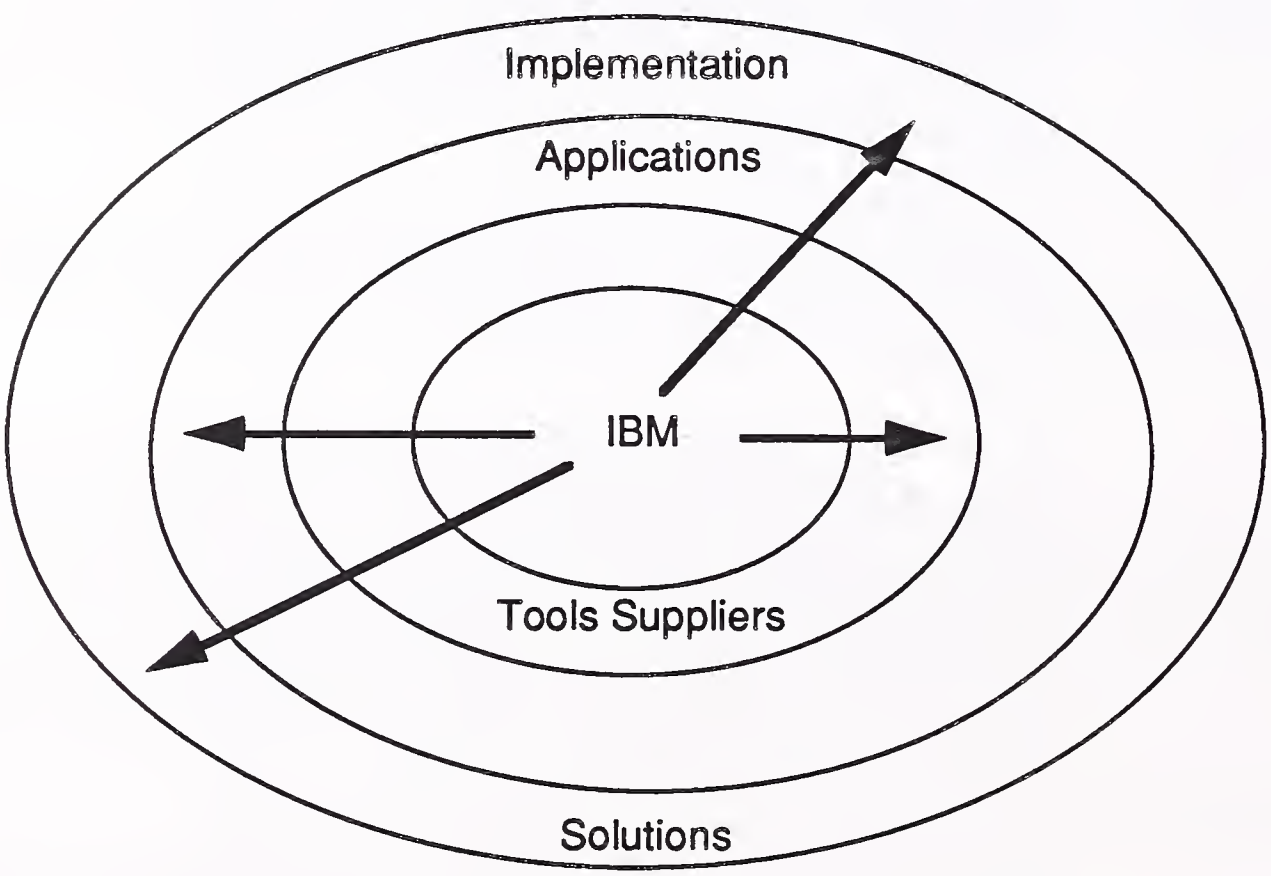
market. Should it have done so, there would have been a direct impact on sales of large equipment, since the basic rationale of the systems operations utility offered by NSD is systems consolidation and rationalization. The raison d'etre of a system operations vendor is diametrically opposed to that of the system vendor: the system vendor wants to sell more systems (equipment and hardware), while the systems operations vendor wants to make the most efficient and profitable use of existing (perhaps old) systems. The systems operations vendor will consolidate as much as possible.

IBM is focusing more on operation support functions such as user support, business (disaster) recovery services, remote 'lights-out' data center operations, conversion services, etc.

Software products and services companies have been the target of many IBM investments. In so doing, IBM is building walls around its products, as depicted in Exhibit II-16.

EXHIBIT II-16

IBM Investment Strategy



For a relatively modest investment (in the hundreds of millions of dollars), IBM has established very strong influence, if not control, over multimillions of dollars of systems purchases. This influence will be

long-term, since the investments are primarily used by recipients to develop software compliant with IBM Strategic Software directions, such as SAA, OS/2, AIX, DB2, AD/Cycle, etc.

This represents a continuing trend in the 1990s as vendors of all kinds seek to expand their direct and indirect spheres of influence. In some cases, target vendors will be used simply as part of a blocking strategy. This obviously could have a very negative impact on their business.

6. CAP Gemini Sogeti (CGS)

Few European vendors have achieved major success in U.S. markets; Software AG and CAP from Germany have been most successful in the software products market. U.K. companies like SDL and Zircon had some significant business before they merged. Others such as GSI have built flourishing units which are still relatively small.

CAP Gemini Sogeti has probably been the most consistent entrant into the U.S. With its purchase of Hoskyns in the U.K. and United Research in the U.S., CGS will approach $2 billion in revenues in 1990. It has thus emerged as one of the largest professional services companies in the world.

Other markets, such as systems integration, system operations, software products and processing services, are definitely ancillary to professional services. There are some geographic variations in this. Hoskyns, for example, is one of the world's foremost system specialist companies.

The acquisition of United Research is very timely for CGS. The company is growing very rapidly and focuses primarily on change management. Most of its business in the past has been non-information services-oriented—this will continue to be the case but will provide opportunities for CGS' other systems-oriented business.

7. Japanese Vendors

Large Japanese software and services companies are already present in the U.S. and Europe. They have a continuous approach to investment in these industries. Japan recognizes that both the U.S. and Europe will be more sensitive to potential loss of control in software than in almost any other area. Since software is a means to an end in many areas, it is an 'enabling' technology. (INPUT has addressed the Japanese attitude to software through publication of a Research Bulletin, *Japanese Computer Software and Products Directions*, written by Bill Totten of KK Ashisuto in Japan).

Japanese vendors will have an increasing influence on the U.S. market. Hitachi and Fujitsu are actively promoting their own products directly in the U.S. All the Japanese laptop producers are active. Many of these

systems vendors use Japanese software companies for services and support in U.S.

This represents a general trend. All Japanese companies, banks, motor vehicle manufacturers, etc., take their suppliers with them when they move to another country. Initially these suppliers contract with local vendors. Then they start to do more themselves with the sponsoring Japanese companies. Their next step is to work for the suppliers to their sponsor company. Then finally they move into direct marketing. This process may take 10 years—but it has already started.

Japanese companies will become significant IS vendors in the world market in the 1990s.

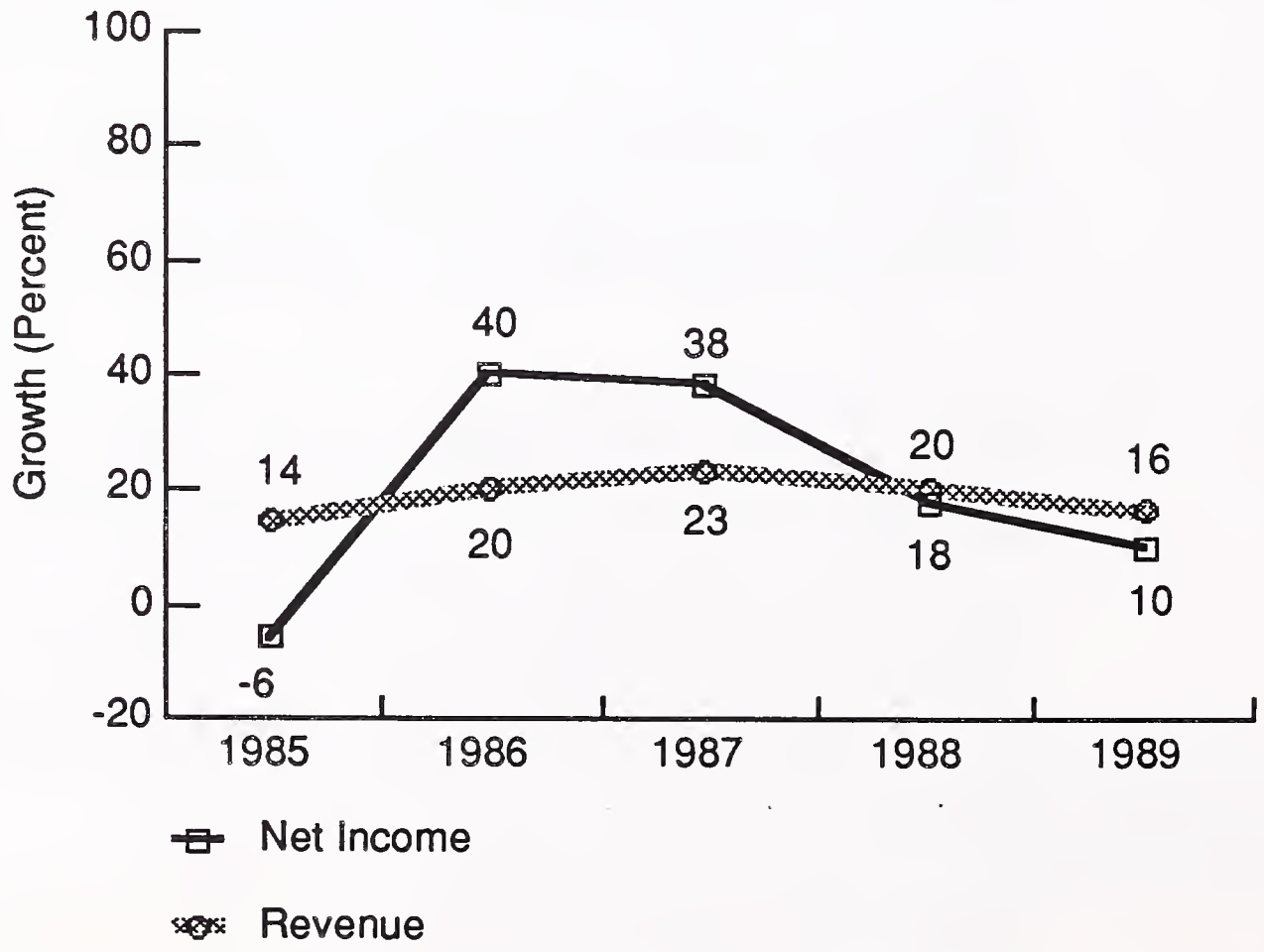
G

Public Information Services Vendor Performance

The public information services companies overall have maintained strong, steady growth during the past five years, with the exception of 1985, when the industry went through a tumultuous period. However, growth in revenues peaked in 1987 and has declined since then, as shown in Exhibit II-17. Profitability recovered in 1986 and 1987 from low levels in 1985, but has again declined since 1987.

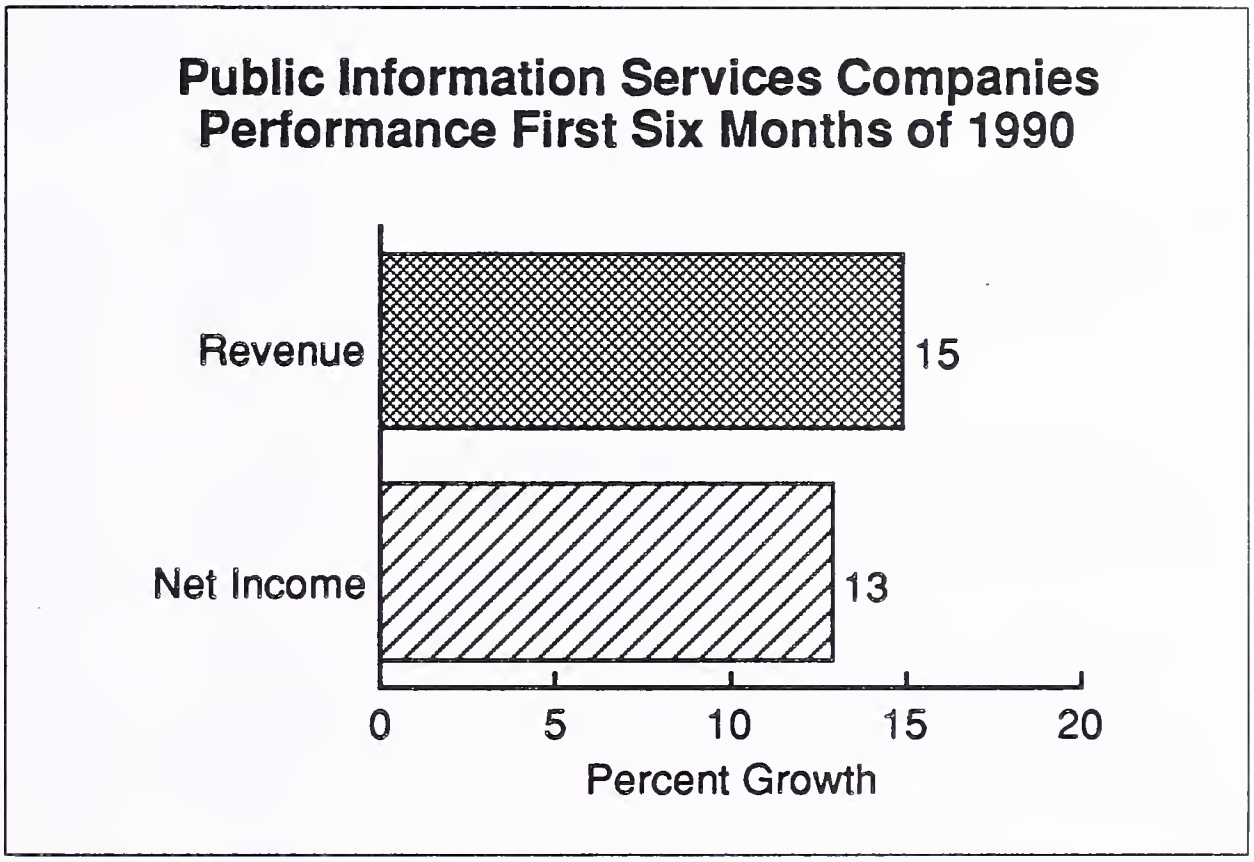
EXHIBIT II-17

Public Information Services Companies Performance 1985-1989



As shown in Exhibit II-18, for the first six months of 1990, revenue growth for public information services companies as a group was 15%. The most significant growth came from application software, systems software, and electronic information services vendors.

EXHIBIT II-18



For the first half of 1990, earnings for public information services companies increased 13% over the same period in 1989. Strong growth by application software, and government and commercial professional services vendors was partially offset by the earnings declines of processing/network services and turnkey systems vendors.

Profitability for information services vendors for the first half of 1990 averaged 7.4%, the same as for the first six months of 1989.

The most significant growth in 1989 came from electronic information services, systems software and application software products vendors, as shown in Exhibit II-19. However, steady moderate growth was maintained by the processing and network services vendors, and commercial professional services vendors.

EXHIBIT II-19

Public Information Services Companies Performance by Type of Vendor, 1985-1989

Type of Vendor		Revenue Growth Rate (Percent)	Net Income Growth Rate (Percent)
Processing/Network Services Companies	1985	16	107
	1986	17	5
	1987	16	39
	1988	17	4
	1989	15	22
Electronic Information Services Companies	1985	28	19
	1986	42	2
	1987	32	45
	1988	30	9
	1989	15	22
Systems Software Products Companies	1985	22	37
	1986	44	48
	1987	57	67
	1988	46	56
	1989	26	20
Application Software Products Companies	1985	10	-7
	1986	23	53
	1987	30	-18
	1988	19	69
	1989	24	39
Government Professional Services Companies	1985	13	2
	1986	16	38
	1987	16	4
	1988	10	37
	1989	9	-31
Commercial Professional Services Companies	1985	25	-10
	1986	20	-36
	1987	14	244
	1988	16	62
	1989	13	-31
Turnkey Systems Companies	1985	7	-96
	1986	10	376
	1987	16	44
	1988	11	-29
	1989	5	-72
Total Information Services Companies	1985	14	-6
	1986	20	40
	1987	23	38
	1988	20	18
	1989	16	10

Earnings growth slowed to 10% in 1989. Strong growth by electronics information services and application software products vendors was offset by the earnings declines of professional services and turnkey systems vendors.

Profitability for information services companies as a whole averaged 7% in 1989.

H

Conclusions

Double-digit annual growth for information services vendors is no longer automatic in the 1990s. Increased competition, market saturation and other factors will make the market far more difficult. However, the overall market retains vital.

The move to outsourcing will be a boon to the information services industry in general. It will provide significant opportunities. Growth rates for the industry as a whole could accelerate dramatically. Vendors should attack the in-house IS budget.

Outside the U.S., market growth will generally be more rapid from a smaller base. National companies will expand their boundaries. The 1980s was a time for testing international markets—the 1990s will see vendors attack these markets aggressively.

Breadth of services and products for a particular customer base will enhance vendors' market portions. The more a given customer can purchase from the same supplier, the better for both sides.

Consolidation driven by rationalization will increase. Smaller, weaker vendors will be absorbed by larger vendors in their 'sphere of influence'.

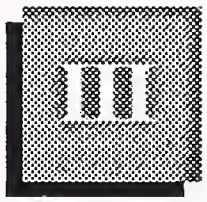
Major vendors, especially systems companies, will seek to widen their spheres of influence as much as possible by partnering and investment strategies. They will also use 'standards' in this process.

Standards, particularly interface standards, could be vital in the 1990s. Development and operating standards will be more contentious.

Opportunities will require more targeted marketing. Positioning of vendors in the customer's/prospect's eyes will be critical. Support services will be the source of customer loyalty, and profit.

Customers want solutions to problems, and that is what information services companies will provide.

Processing Services Market Analysis



Processing Services Market Analysis

A

Procesing Services Market, 1989

Historically, processing services was the first delivery mode tracked by INPUT. Emerging in the 1960s and growing rapidly through the 1970s, this delivery mode has been led by a number of large and very successful services organizations.

In the early years, market growth was based on providing users with access to resources and capabilities that they could not afford to provide for themselves. Both small and large clients used processing services for transaction processing, problem solving, information analysis, and access to specialized data bases.

During the 1980s, this business mix changed dramatically:

- Traditional timesharing activities were largely transferred to personal computers
- Transaction processing continued to forge steadily ahead
- Network-oriented services—including access to remote data—became a separate line of business
- Systems operations (facilities management) gained increasing acceptance and also became a separate line of business

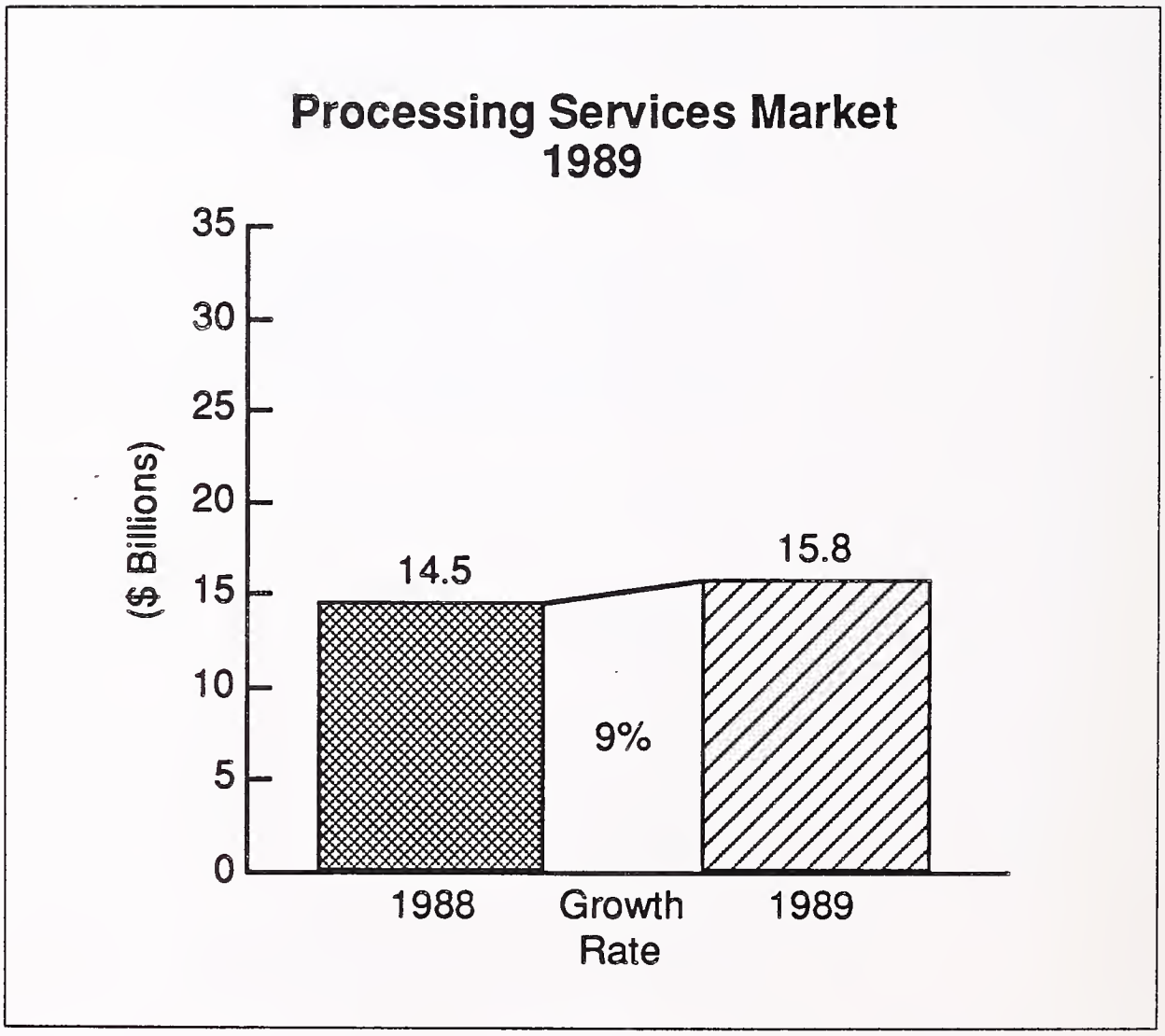
Much of the growth during the late 1980s was driven by applications and systems that required networks and shared access among companies; credit card and other bank processing became particularly attractive opportunities. Complementing this trend was the increasing importance of disaster recovery services to companies which had become increasingly dependent on computer systems to run their day-to-day operations.

Tracking the historical growth of this market is complicated by the fact that the original processing services business has spawned two new delivery modes. INPUT made network-oriented services a separate delivery mode in 1987. Systems operations is also being split out as a separate delivery mode starting in 1990.

For purposes of this report, INPUT is breaking out systems operations from its two parent delivery modes: processing services and professional services. Therefore, the size of these two delivery modes, as reported here, will be smaller than it appears in INPUT's 1989 reports.

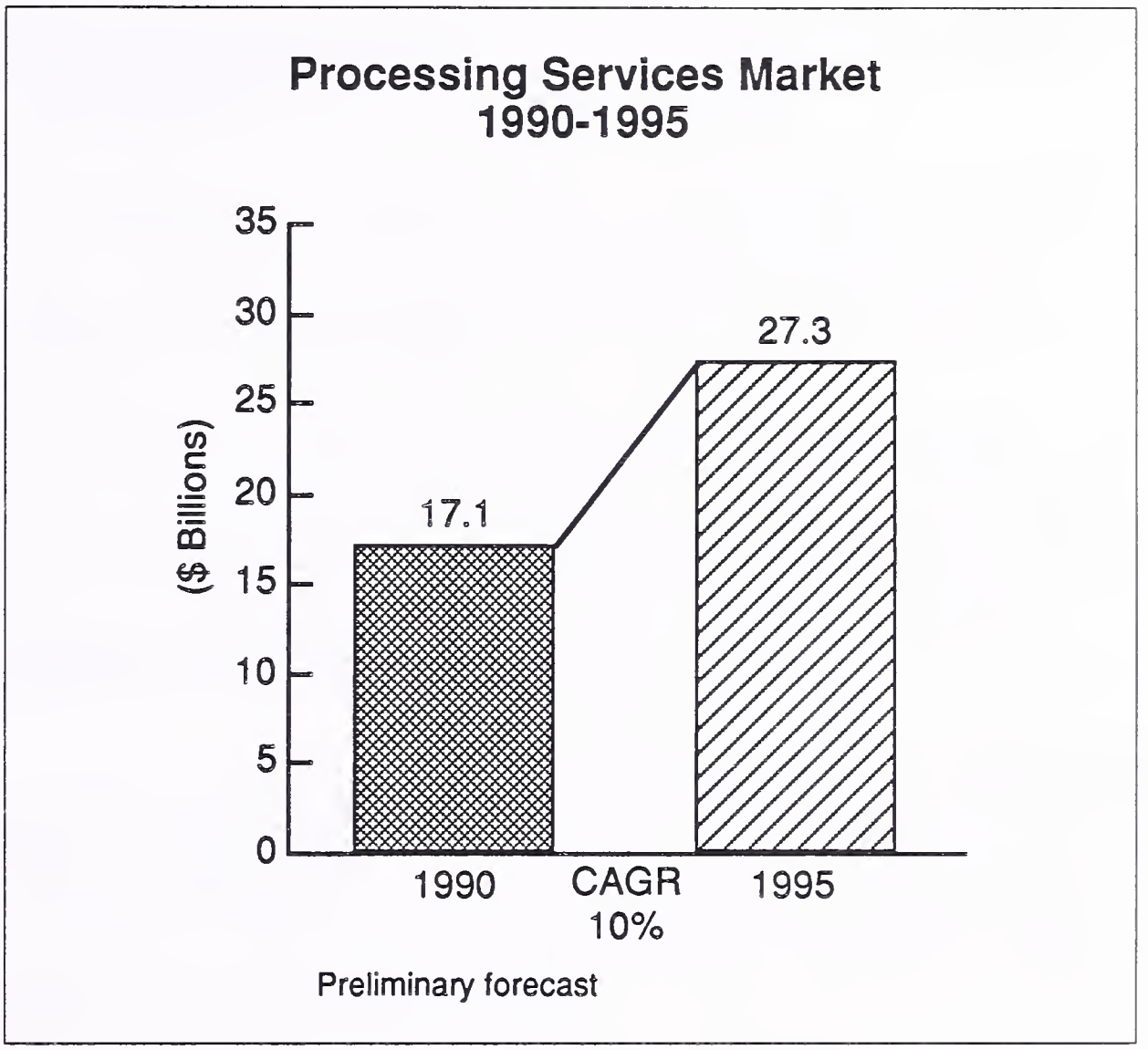
From an adjusted base of $14.5 billion in 1988, processing services activities (excluding systems operations) grew by 9% to $15.8 billion in 1989, as shown in Exhibit III-1. This is a somewhat lower growth rate than previously reported for this market—primarily because systems operations was the fastest growing component of the delivery mode.

EXHIBIT III-1



Over the next five years, growth should continue at approximately the same pace. From $17.1 billion in 1990, the market is expected to reach $27.3 billion in 1995, a compound growth rate of 10% (see Exhibit III-2).

EXHIBIT III-2



B

Processing Services Market Trends and Issues

Processing services, as currently defined, consists of transaction processing, utility processing, and other processing. Transaction processing, which constitutes over 80% of this delivery mode, is based on the customer's willingness to outsource specific applications—often of a critical nature.

Utility processing is defined as the use of raw computing power and tools to develop tailored applications or solutions to specific user problems. As compared with transaction processing, where the vendor provides a standard application solution, the user is generally responsible for developing and managing applications that are supported by utility processing.

Other processing services include data entry, computer output microfilming (COM), and disaster backup/recovery services.

Exhibits III-3 and III-4 summarize the driving and inhibiting forces in the processing services market.

EXHIBIT III-3

Processing Services Market Driving Forces

- Customer convenience and inertia
- Outsourcing trends
- Systems integration project extension
- Industry-standard applications
- Vendor specialization/expertise
- Immediate availability of solutions
- Disaster recovery requirements

EXHIBIT III-4

Processing Services Market Inhibiting Forces

- Price/performance disadvantages
- Perceived lack of user control
- Competition from other delivery modes
- Corporate restructuring
- Market entry costs/maturity

Customers initially go to a processing services vendor because it is difficult or inconvenient for them to perform the work that is outsourced to the vendor. Once the relationship is established, customers generally do not switch processing services vendors, because the costs and inconvenience of switching are so high. Unless there is a significant change in the client's business needs, or a significant problem with the vendor's service level, there is little pressure or motivation to change the business relationship.

The recent publicity surrounding major outsourcing contracts (e.g., the IBM/Kodak deal) has made it easier for management to elect this option, whether through systems operations or processing services. For smaller

clients, in particular, the sight of Kodak "giving up control" to IBM allays a major fear of management—the concern over dependence on an outside resource for a critical part of their operation.

For the client that has already accepted this dependency by entering into a systems integration contract, the live operation of the new system provides a natural opportunity for the vendor to assume the operations management role—although this would normally be done under a systems operations contract rather than a processing services contract.

For the smaller firm that has a straightforward application need, the processing services firm offers several key advantages: standard applications are immediately available from a firm with the industry knowledge and expertise to install, maintain and integrate them with the firm's other processing systems. In addition, the processing services vendor can implement a much more comprehensive disaster backup and recovery capability than the small firm could afford on its own.

All this comes at a price, however, and the biggest inhibitor to market growth is the perceived cost/performance disadvantage of processing services relative to an in-house operation. Alternative delivery modes (turnkey systems or applications software) can appear to provide more cost-effective solutions, and also reduce the perceived lack of control which concerns many potential clients. All these factors tend to reduce user demand for processing services.

Corporate restructuring and consolidation are also threatening the market for processing services. In the banking sector—traditionally the largest user of processing services—mergers and acquisitions are increasing due to the thrift crisis and deregulation. Over the past several years, Systematics has lost several large accounts in California due to acquisitions by Security Pacific and Wells Fargo. On the other hand, Resolution Trust Corporation, the government organization which acquires and manages failed thrifts, recently awarded Systematics a contract to manage operations in 15 of the bankrupt S&Ls that it has taken over. While restructuring thus creates both threats and opportunities for vendors, the net effect is generally negative.

On the supply side, the maturity of this market makes entry difficult and capital-intensive. New entrants need to make significant investments in software, equipment, and a service infrastructure just to get started. Although the market is large, the slow real growth rate makes it difficult to survive without attacking the market share of existing vendors. Given the difficulties of getting customers to switch vendors within the same delivery mode, this is a significant challenge.

C

Leading Processing Services Vendors

Processing services vendors are employing a number of offensive and defensive strategies to ensure their continued profitable existence. Among these are:

- Growth through acquisition
- Rationalization through divestiture
- Exploitation of scale economies
- Expansion into multiple delivery modes

Exhibit III-5 lists leading processing services vendors. The vendors profiled below illustrate these trends.

EXHIBIT III-5

Leading Processing Services Vendors

- Automated Data Processing
- Electronic Data Systems
- Control Data Corporation
- First Financial Management
- First Data Resources
- Shared Medical Systems
- McDonnell Douglas
- Martin Marietta
- Mastercard International
- CCH Computax
- Computer Sciences Corporation
- General Electric Information Services
- National Data Corporation
- Systematics

1. Automatic Data Processing (ADP)

ADP, one of the pioneer processing services vendors, has been in business since 1949. Begun as a payroll processing company operating on unit record (tabulating) equipment, it computerized its operations and went public in 1961.

In recent years, it has undertaken an active acquisition program to expand the scope of its services. Although payroll and associated accounting functions still provide the bulk of its revenues, ADP now has significant operations in brokerage services, automobile dealer services, and claims services for automobile insurers and repairers.

ADP's strategy follows the guidelines that General Electric's president, Jack Welch, has set down for his company: stay out of any market in which you cannot maintain a leading position. As a result, ADP has also sold off a number of businesses it either entered at an earlier time or became involved in as part of a larger acquisition.

In late 1989 and early 1990, for example, ADP sold its automated teller business to Electronic Data Systems (EDS) and its real estate service business to a private company. It also sold its banking and thrift processing service business to Welsh, Carson, Anderson & Stowe, and its Canadian brokerage quotation business to a private company. Its manufacturing services business was also sold to the division's management in a leveraged buyout transaction.

In most of these cases, the market was so fragmented and ADP's position was so relatively small that ADP could not hope to establish a leading position. In addition, the outlook for thrift and banking processing services is threatened by deregulation and the thrift industry financial crisis.

By contrast, the U.S. market for brokerage quotation services is very large and the costs of entry are so high that it is a natural oligopoly. By taking over the development of Merrill Lynch's new quote system from the failed IBM/Merrill joint venture IMNET™, ADP acquired a base of more than 10,000 terminals at one time and assured itself a commanding presence in this market.

As another part of its strategy for controlling its markets, ADP has formed a number of marketing alliances with organizations which otherwise might be its competitors. Payroll and accounting services are offered through banks and CPA firms to their clients, making it possible for banks and CPAs to provide a wider range of services at no incremental cost to themselves.

2. Electronic Data Systems (EDS)

EDS was founded at approximately the same time that ADP went public, and during its early years followed a similar growth strategy: building a dominant position in a single large market. In EDS's case it was an industry-based focus: systems operations for Blue Cross/Blue Shield organizations. However, it has since branched out into a much wider range of industries than has ADP, which continues to emphasize the

cross-industry functional markets for human resource and accounting systems.

EDS' formal acquisitions account for only a small amount of its growth over the last six years, with two major exceptions. In the 1984 merger of EDS and General Motors, EDS essentially acquired the GM data processing operations, nearly quadrupling its size in the process. And in 1988, EDS acquired MTech, a major bank processing organization owned by MCorp, a large Texas bank in financial difficulty. By the end of 1989, the non-GM portion of EDS' business had grown to the point where it accounted for 45% of total EDS revenues.

At the present time, EDS is also involved in negotiations with Texas Air to acquire the Airline Services Division of System One Corporation. If consummated, this deal would launch EDS into the world of computerized reservations systems, an oligopoly market similar to the stock quotation business of ADP. However, the transaction is mired in the litigation surrounding Eastern Airlines' bankruptcy, and it is uncertain how or when the negotions will be completed.

Although formal acquisitions (i.e., outright purchases of separate legal entities) have not been a major factor in EDS' growth, a significant portion of its growth has come from transactions which are very similar to an acquisition. In the systems operations business on which EDS built its reputation, the vendor essentially acquires the data processing operations of its client companies. These transactions typically involve EDS assuming responsibility for the client's staff and facilities, including hardware, premises, etc. Such transactions escape the financial reporting associated with outright purchases of separate corporations, but in most other respects are equivalent to a formal acquisition.

Another strategy common to EDS and ADP is to develop and exploit significant economies of scale. In both cases, the corporations have developed processing megacenters and nationwide data networks, allowing them to handle both processing and backup at a fraction of the cost that their individual clients would face. EDS*NET, the private digital network which will ultimately manage the telecommunications needs of EDS' 21 worldwide Information Processing Centers, already handles over 730 million transactions per month—nearly 17,000 per minute!

Perhaps more importantly, scale allows both EDS and ADP to maintain leading-edge capabilities in rapidly changing environments—both technology - and business-related. For example, in areas such as banking and finance, a rapidly evolving regulatory and competitive environment makes it difficult for small institutions to maintain their own systems. By exploiting these scale economies, EDS is able to provide its clients with leading-edge systems capabilities at low risk and a reasonable cost, allowing them to compete in specialized markets or niches without being

concerned for the adequacy of their information systems. Such capabilities have allowed EDS to acquire the processing business of more than 20% of the nation's credit unions.

3. Systematics

Another of the pioneers of the processing services industry, Systematics was founded in 1968. Since that time, it has focused solely on the banking and finance industry.

Headquartered in Little Rock, Arkansas, Systematics operated as a closely-held subsidiary of a local investment banking firm (Stephens, Inc.) through 1982, when it made its first public stock offering. In early 1990 Systematics was acquired by Alltel.

Unlike ADP and EDS, Systematics has made only two acquisitions, neither of which contributes measurably to its over $200 million revenue base. Both of these acquisitions were strategic in nature, filling out niches in the company's overall line of services. Matrix Management, Inc. is a well-regarded management consulting firm specializing in the financial services industry. This acquisition allows Systematics to provide support to its clients' back-office operations, improving overall efficiency and coordination with the data processing function while providing the client with an addition source of savings. Chanin Consulting Services, the other acquisition, brought to Systematics a securities lending software package that is popular with large trust departments, thus providing another avenue of penetration into potential customer accounts.

Systematics operates in four delivery modes: processing services, turnkey systems, applications software, and professional services. A key element of its strategy is to build and maintain an integrated, core set of systems that can be provided to a wide range of customers in whatever way best suits the customer's needs. Systematics will license as applications software the same packages that it runs in its own processing centers. It also offers an IBM AS/400-based turnkey package.

By providing the same user functionality through multiple channels, Systematics not only expands the size of its market, it also retains account control when a customer's needs change. In addition, services such as disaster backup and recovery services, contingency planning, and consulting are logical "extras" that are applicable no matter what the delivery mode of the primary service.

As part of its effort to forge a strategic relationship with its clients, Systematics operates a Career Development Center in Little Rock. Both Systematics and client staff attend classes together in this facility, and courses are offered in principles of banking, effective supervision, management, basic and advanced programming, systems design and architecture, and in-depth studies of individual Systematics applications. During 1989, over half of the center's students were from client firms.

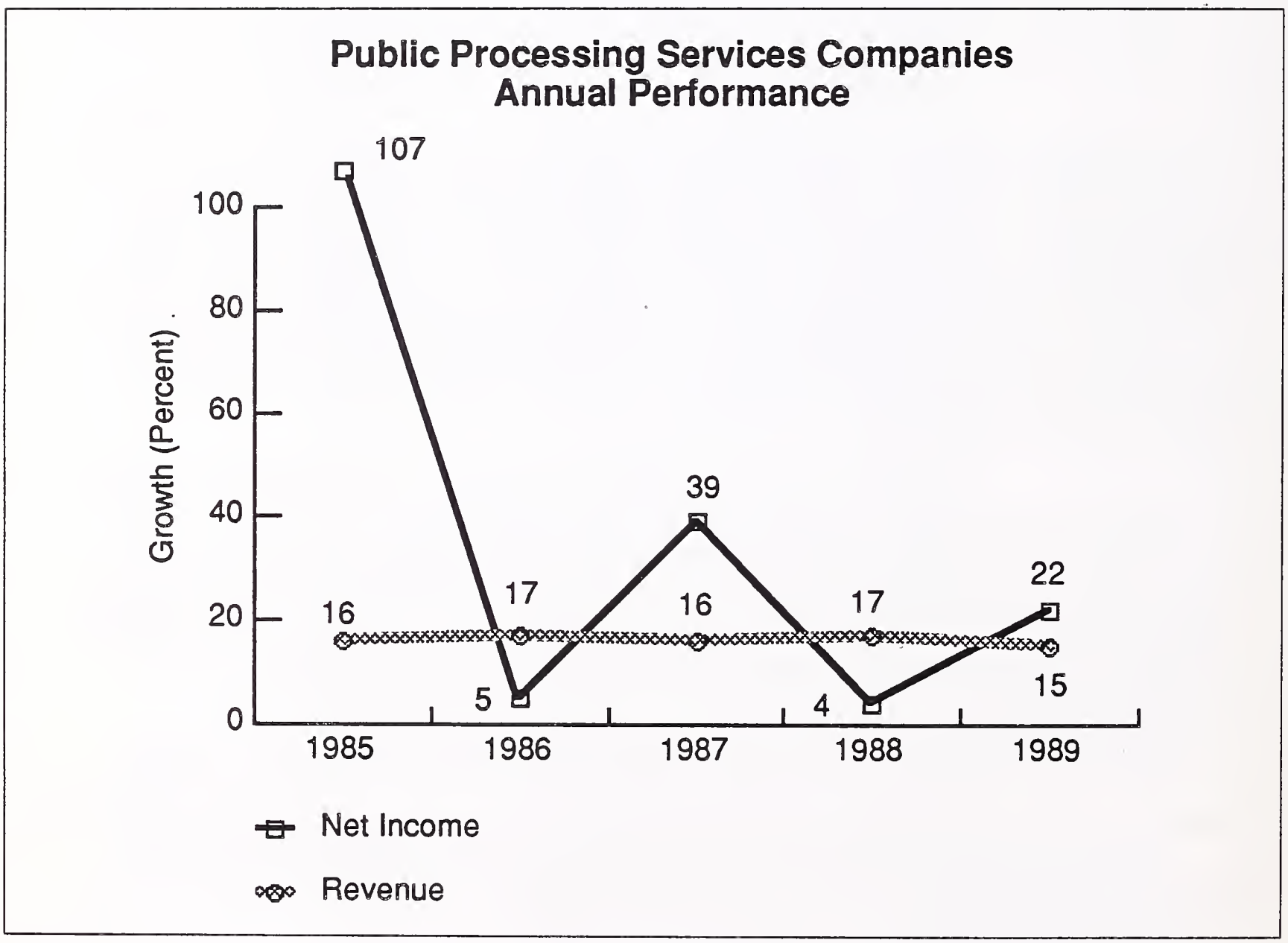
D

Public Processing Services Company Performance

1. 1989 Performance

Revenue growth for the public processing/network services group has remained relatively constant during the past five years, ranging between 15% and 17% per year, as shown in Exhibit III-6.

EXHIBIT III-6



Earnings growth for this group has fluctuated significantly during the past five years. Earnings grew 22% in 1989, compared with only 4% in 1988, 39% in 1987 and 5% in 1986.

Profitability for the processing/network services group is running slightly above average for the information services industry as a whole. During 1989, the profit margin maintained by the group was 8.5%, compared to the industry average of 7%.

Exhibit III-7 provides revenues and net income results by company.

EXHIBIT III-7

Public Processing Services Companies Revenue and Net Income

Company Name	Revenue			Net Income		
	1988 ($ Millions)	1989 ($ Millions)	% Change	1988 ($ Millions)	1989 ($ Millions)	% Change
ADP	1,616.8	1,689.5	4	178.2	196.2	10
COMDATA HOLDINGS	111.3	159.0 [1]	43	-8.8	-11.7 [2]	-33
COMP-U-CHECK	8.7	7.7	-11	-0.4	-1.9	-386
COMPUTER LAN	117.4	126.1	7	-1.9 [3]	0.7	133
COMPUTER SERVICES	13.5	15.2	12	1.4	1.4	-1
CONCORD COMP.	27.4	31.0	13	2.9	3.8	31
CYCARE	84.0	86.2	3	0.5	3.1	520
DST SYSTEMS	138.4	127.0	-8	11.6	6.0 [4]	-48
FIRST FIN. MGMT.	427.6 [5]	666.7 [5]	56	34.4	56.8	65
FISERV	125.0	164.0 [6]	31	9.1	11.4	25
GTECH	146.0	171.2	17	3.1 [7]	5.4	74
M/A/R/C	62.3	61.6	-1	3.0	2.9	-3
NATIONAL DATA	194.2	269.3 [8]	39	17.6	24.9 [9]	41
PAYCHEX	91.1	110.3	21	8.4	9.6	14
PAY-FONE	6.0	5.9	-2	0.1	0.0	81
SANDATA	9.5	11.9	25	0.1	0.2	100
SCS/COMPUTER	30.4	35.8	18	1.2	1.2	0
SEI	131.9	149.1	13	13.2	12.1	-8
SHARED MEDICAL	378.7	390.0	3	29.3	23.1 [10]	-21
SYSTEMATICS	194.3	220.7	14	17.2	19.5	13
TELECREDIT	153.8	167.1	9	1.0 [11]	27.9	2,668
TOTAL SYS.SVCS	56.2	65.9	17	9.6	11.3	18
WORLCO DATA	12.1	13.2	9	-1.0	-0.4	57
Total	4,136.5	4,744.3	15	329.8	403.4	22

Several public processing/network services firms were acquired during 1989 and were omitted from this report, including DYATRON (acquired by SunGard Data Systems), ISI Systems (acquired by Memotec Data), and National FSI (acquired by SEI Corporation).

Hale Systems was removed from the list because it went out of business. Scicom Data was removed because it now operates as a private company.

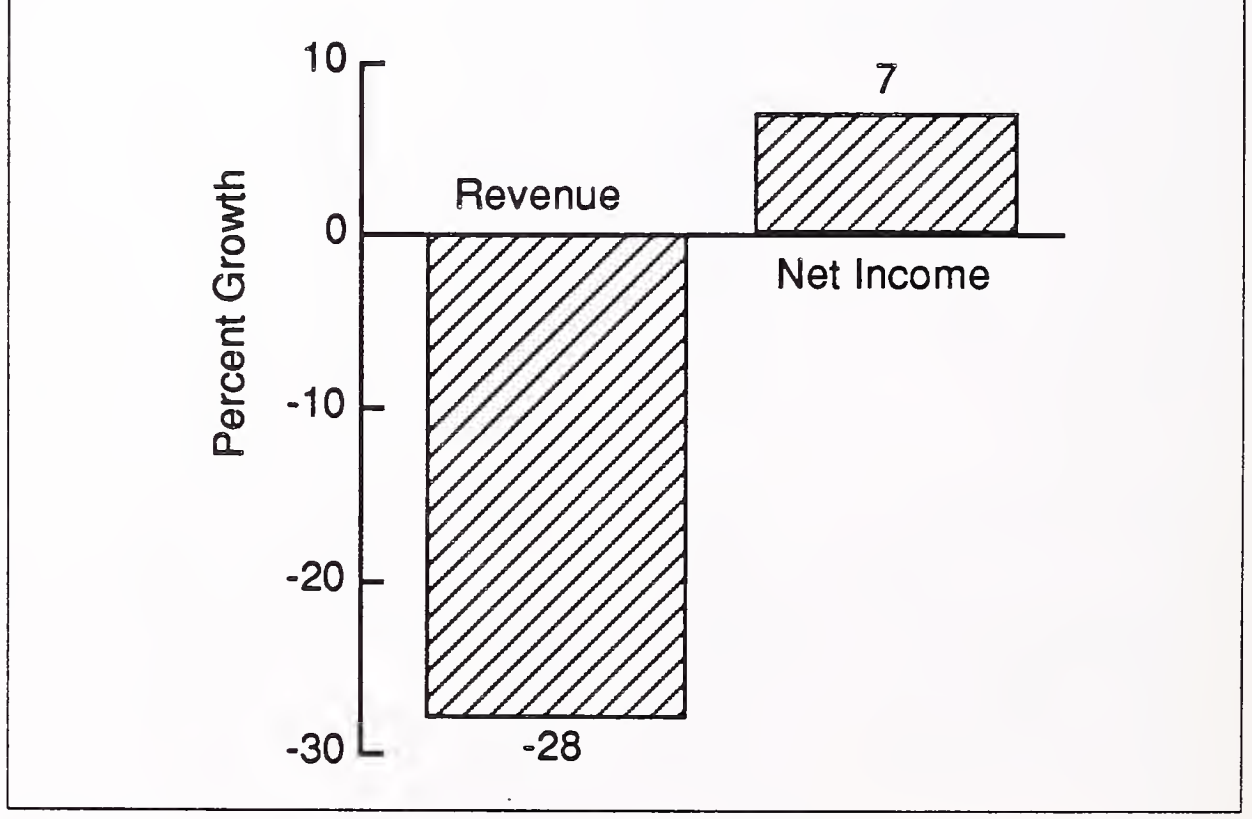
Systematics results are included for this report; however, the company was acquired by Alltel in early 1990.

2. The First Six Months of 1990

As shown in Exhibit III-8, revenue growth for public processing/network services vendors slowed to 7% for the first six months of 1990 over the same period in 1989. The majority of the companies in this group achieved revenue growth during the period, with the largest growth (46%) coming from Comdata Holdings, whose results were attributed to the acquisition of certain funds transfer-related businesses from First Data Resources (American Express) in mid-1989.

EXHIBIT III-8

Public Processing Services Companies Performance First Six Months of 1990



Earnings for this group of companies declined 28% for the first six months of 1990 as compared to the first six months of 1989. Results for the first six months of this year were negatively impacted by a $35.8 million loss reported by Comdata Holdings, which included a special $23 million charge for the prepayment of a non-compete obligation arising from the acquisitions made during 1989. Losses were also reported by CyCare Systems (due to restructuring expenses resulting from the company's decision to focus on physician-oriented services while

deemphasizing or eliminating other products and services) and National Data Corporation (due to restructuring charges related primarily to the closing of a voice authorization center in Reno, NV).

Profitability for the group for the first half of 1990 was 6.6%, compared to 9.8% for the same period a year ago.

GTECH was removed from the list because it now operates as a private company. Systematics also was removed from the list because it was acquired by Alltel in early 1990.

3. Footnotes

1. Comdata's revenue increase during 1989 was primarily attributed to the acquisition of certain funds transfer-related businesses from First Data Resources in June 1989, as well as the acquisition of American Facsimile Systems, Inc. in December 1988. These acquisitions added approximately $35 million to 1989 revenue.

2. Comdata's net losses increased during 1989 due to acquisition-related costs and nonrecurring expenses of $3.9 million resulting from a reduction in the carrying value of equipment of its Retail Check Payment segment.

3. Computer Language Research's 1988 results include a $1.5 million gain from the sale of its Micro-Tax software product line.

4. DST's 1989 net income was impacted by costs incurred to accelerate the development of a new image-based processing system.

5. First Financial Management Corporation results were restated to reflect the pooling-of-interests acquisition of MicroBilt in 1989. Revenue growth in 1989 was partly attributed to acquisitions, including MicroBilt, the Computer Company, and Data Preparation, Inc. Georgia Federal Bank, also acquired in 1989, contributed $92 million to total 1989 revenue.

6. FIserv's 1989 revenue growth was partly attributed to the 1989 acquisitions of Triad Software Network, Ltd. and Northeast Datacom, Inc.

7. GTECH's 1988 results include a one-time gain of $2.7 million from the sale of its investment in InterVoice, Inc. and a loss from discontinued operations of $2.4 million associated with its Datamax subsidiary.

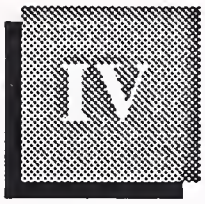
8. National Data's 1989 results were partly attributed to the acquisition of Modular Data, Inc. in February 1989.

9. National Data's 1989 results include a final adjustment of $1.1 million in income related to the discontinuance and sale of the company's Rapidata processing business.

10. Shared Medical Systems' 1989 net income includes $5 million resulting from a change in the method of accounting for income taxes, less approximately $7 million in recurring charges related primarily to employee benefit plans and equipment reserves.

11. Telecredit's 1988 results include a $25.2 million provision related to the restructuring of its Light Signatures Inc. subsidiary.

Network Services Market Analysis



Network Services Market Analysis

A Network Services Market, 1989

Network services include products and services delivered through network connections. The network services sector can be divided into two broad categories: electronic information services and network applications. Applications include services such as value-added networks (VANs), electronic data interchange (EDI), and electronic mail. Information services include on-line data bases, news, videotext, and other services directly related to the delivery of information.

The network services markets continue to be characterized by optimistic outlooks from many vendors. However, the emergence of new, competitive technologies is having a dampening effect on growth of the sector.

As shown in Exhibit IV-1, the network services market grew 21% in 1989, reaching $6.9 billion. This growth rate was down slightly from the 1988 rate of 25%. Of the total market, information services are expected to represent an estimated 75%. Though applications are growing somewhat faster, they are expected to continue to represent the smaller portion of the sector.

As shown in Exhibit IV-2, the network services market is expected to grow from an estimated $8.3 billion in 1990 to $20 billion by 1995, a compound growth rate of 19%. Reduction in the projected growth rate is directly related to a number of trends and issues for this delivery mode. However, there is opportunity for these figures to change significantly.

EXHIBIT IV-1

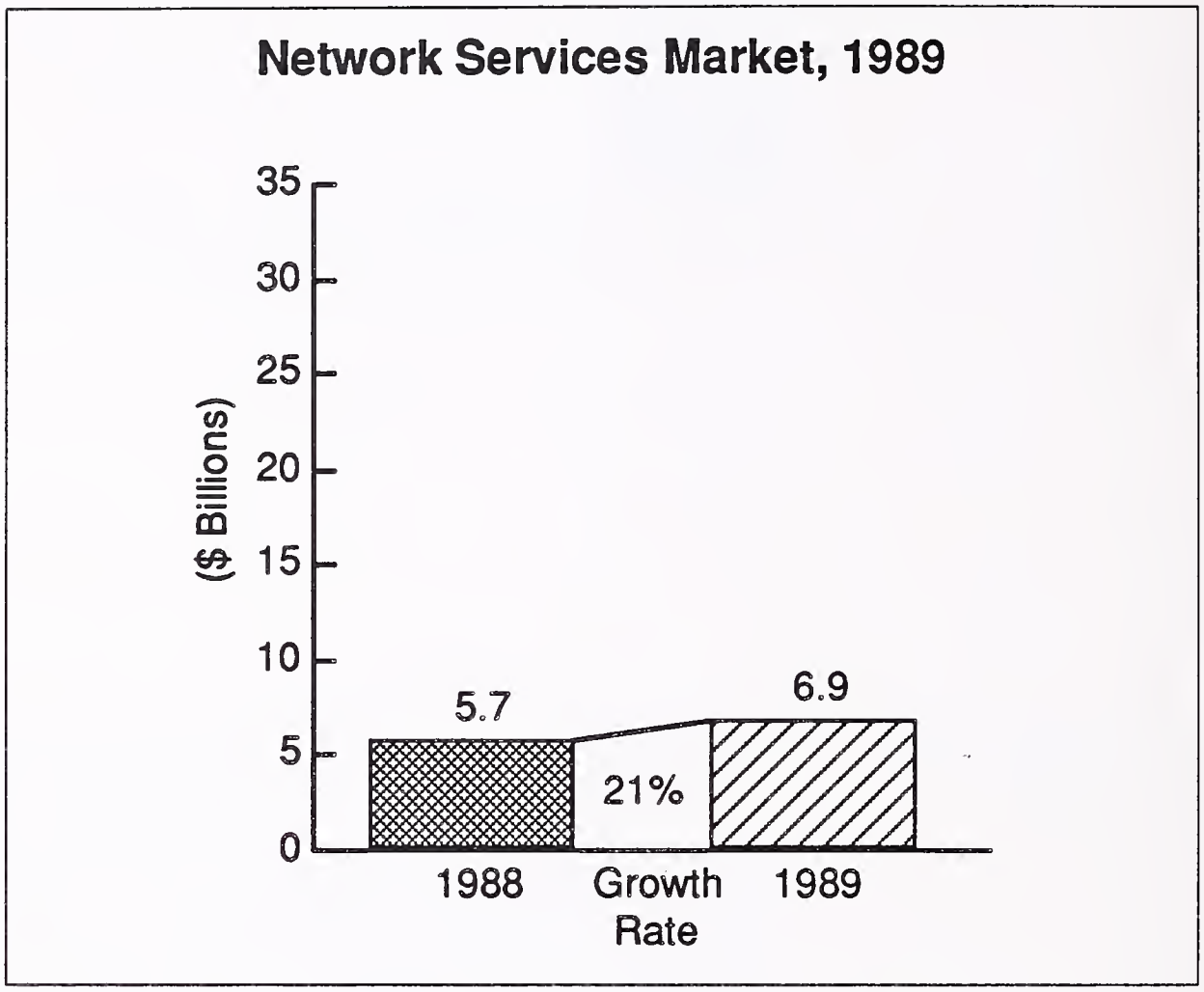
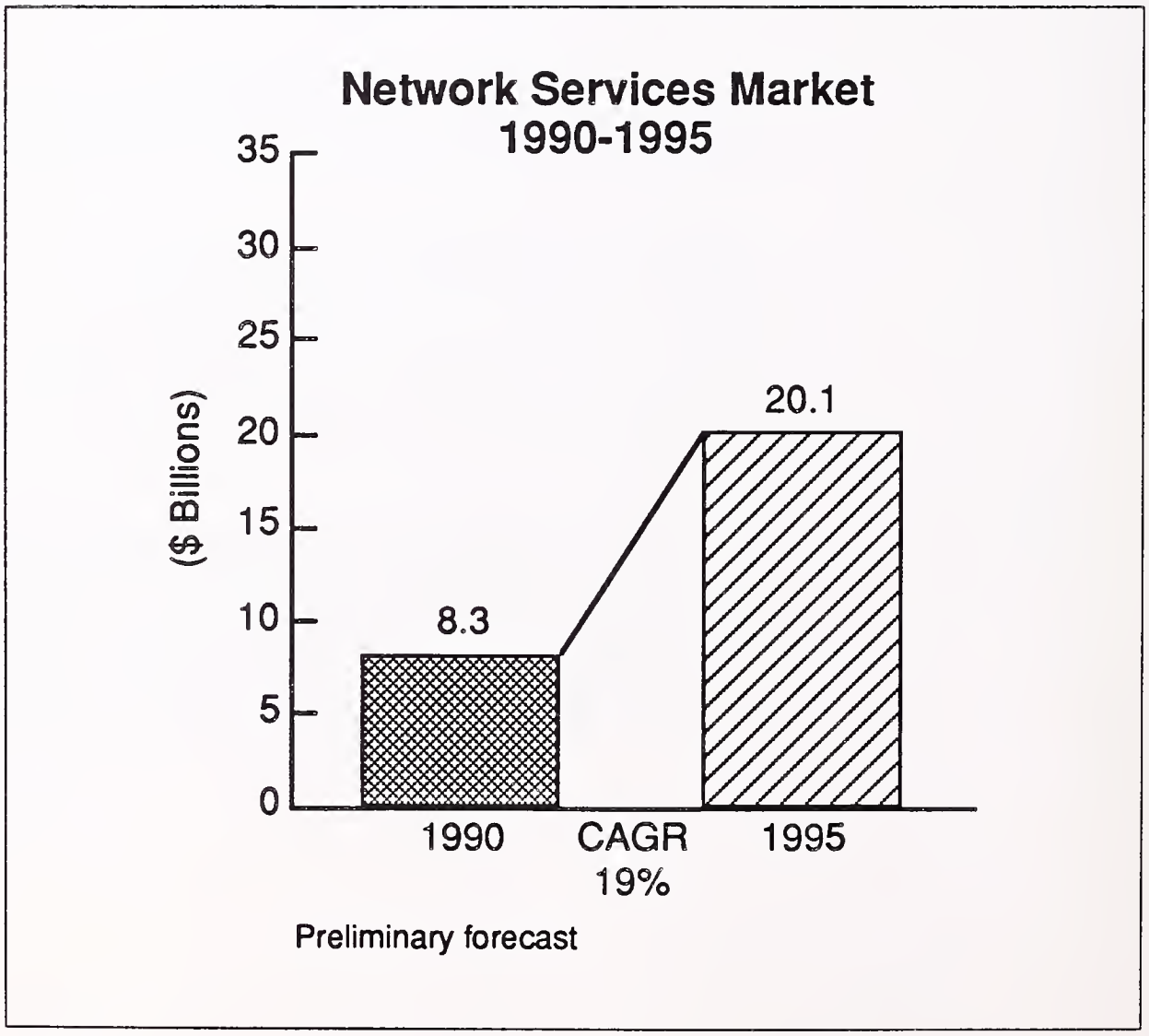


EXHIBIT IV-2



B

Network Services Market Trends and Issues

Network services market trends and issues are characterized by the driving forces and inhibiting factors summarized in Exhibits IV-3 and IV-4. Although the driving forces are important to continued growth of the industry, the inhibiting factors are, at least in the short term, having the greatest effect on overall growth.

EXHIBIT IV-3

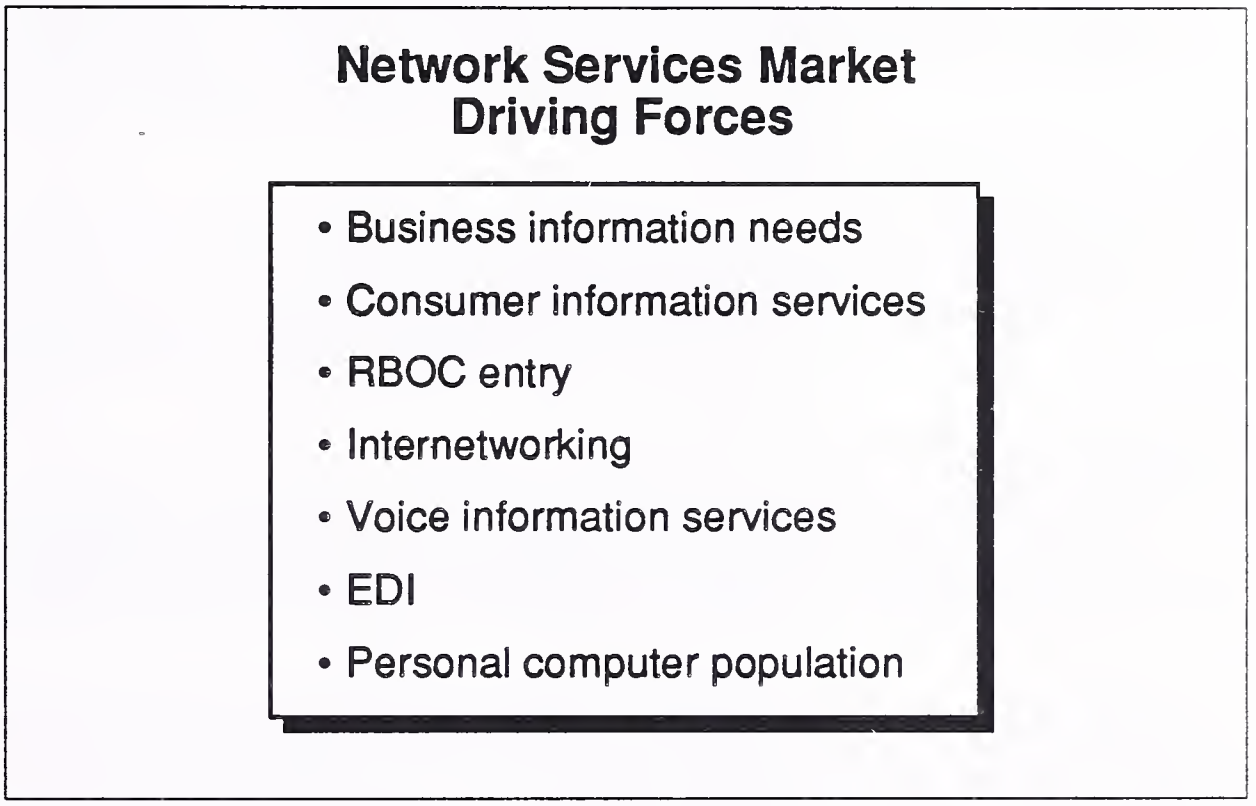
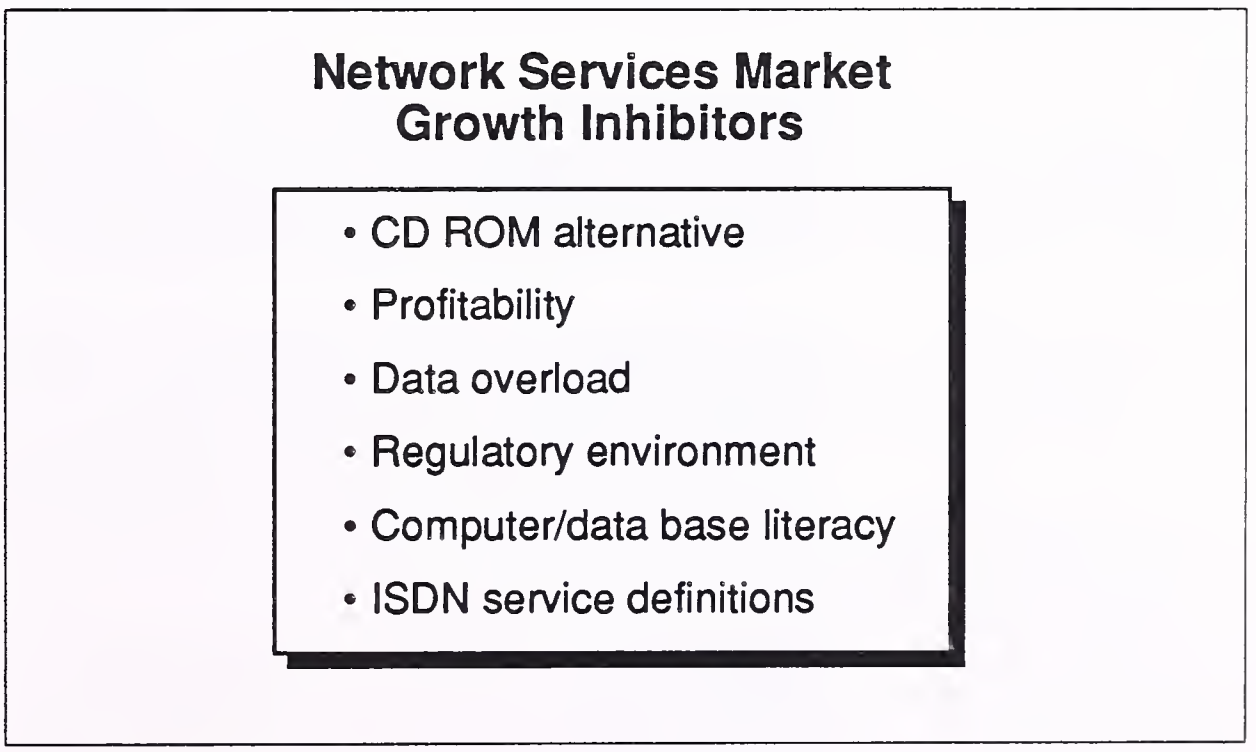


EXHIBIT IV-4



The need of business to obtain information and communicate quickly and effectively is the greatest contributor to growth of the network services market. With organizations becoming smaller and more fragmented, there is growing need to ensure that data and information is obtained and delivered quickly.

Contributing to the business need is globalization. Distance and time zone differences necessitate use of communication methods that are independent of time differences. The global competitive environment also necessitates increasingly timely data analysis.

The market for consumer information continues to grow. However, growth is slow. Companies such as CompuServe continue to add new services and Prodigy continues to report a growing market. Detracting from growth of the consumer information service market are several factors.

- A continuing general lack of literacy in the use of computers and data bases inhibits many consumers from making greater use of on-line services. Though overall computer literacy continues to increase, consumers view on-line data bases as overly complex and difficult to use.

- Consumers question the cost effectiveness of on-line information. Is information obtained on-line really more valuable than information obtained within several days at a third the cost?

- Consumers also question the use of on-line systems compared to other ways of accomplishing the same task. Is an airline reservation made directly through an on-line service as valid as a reservation through a telephone call made directly to an airline?

Although consumer information services have not experienced the rate of growth that many providers would like, the continuing growth of PCs is expected to stimulate many to increase their use of these services. PCs with built-in modems reduce user fears and services that have fixed monthly fees increase consumer acceptance.

Restricted from entry into the information services business, permission for the RBOCs to provide gateway services is an initial step toward the RBOCs providing comprehensive information services over the next several years. Whether directly or through more tightly aligned agreements, RBOC entry into information services will stimulate lower cost and greater use by consumers.

The growing ability to process messages across multiple networks (internetworking) will provide a significant boost to services such as electronic mail. Vendors that have resisted internetwork connections as they worked to establish market share have begun to recognize that network quality, service breadth, and customer service are more important than which network provides the customer connection. Overall use will grow, to everyone's benefit, when users do not have to be concerned about multiple network connections.

Voice messaging services have grown dramatically over the past several years. The growth will continue for the foreseeable future.

The competitive environment necessitates that individuals be increasingly available. Voice messaging provides a means for the receipt and sharing of messages quickly and easily. In addition, systems that permit automated voice solicitation significantly expand an organization's ability to contact a large population quickly and easily.

Growth of electronic data interchange (EDI) will continue to be a strong contributor to growth of the network services industry. Though growth continues to be inhibited by a lack of standards, an increasing number of large organizations view EDI as a means to reduce operating costs and enhance competitive position.

Because of potential high cost of investment in EDI software and a lack of standards, many organizations view VAN services as the best means of obtaining the benefits of EDI. With VANs responsible for ensuring software and network compatibility, this trend is expected to continue for the foreseeable future.

Though the driving forces continue to stimulate growth of the industry, the inhibiting factors listed in Exhibit IV-4 are having a significant effect. Chief among the factors are the growth of CD ROM as a means of information delivery and the profitability of network services, particularly for consumer services.

Growth of CD ROM has been dramatic. The CD ROM, with significantly lower cost per unit of information, and the ability of PCs and workstations to manipulate data, have begun to pose a significant threat to traditional on-line data base services.

Organizations such as Dialog have recognized that CD ROMs pose a competitive threat and have begun to develop information delivery strategies that include alternate delivery forms.

Increasing use of CD ROMs will continue for some time, requiring that organizations structure multiple service delivery strategies. Key to the strategy of on-line service providers of the future will be an ability to provide historical data through CD ROM and current, time-sensitive information, and to update or augment historical data through on-line services.

Profitability continues to be a significant consideration for both information and network application service providers. Profitability margins have been continually reduced due to increased competition and competitive pricing. Compounding profitability problems has been slow growth of the consumer service market.

Profitability considerations are not expected to abate, and high market entry costs have effectively shut out new entrants. However, this could change, as RBOCs are permitted to begin providing information services.

Entry costs, profitability considerations, and alternative delivery strategies will dominate provider considerations for at least the next several years. The potential for RBOC competition will grow as regulations governing RBOC activities are liberalized.

An overload in the amount of available data is also an inhibitor to continued growth. The volume of information available precludes many organizations or individuals from effectively using what is already available.

Storing and retrieving the increasing volume of information increases costs and, without commensurate increases in use, reduces profitability. Strategies that will distinguish historical and time-sensitive information and offer alternative delivery methods will receive increasing attention.

The regulatory environment continues in a state of flux. Domestically, debate over RBOC entry into information services dominates regulatory considerations. RBOCs will continue to seek entry. Traditional providers, recognizing significant threat, will continue to urge restraint. INPUT expects that RBOCs will be permitted to begin providing information services, in some form, within the next five years.

The international regulatory environment is also in a state of flux. Specific concerns relate to inroads of foreign providers into U.S. markets and potential for market exclusion in Europe as a result of the 1992 market changes.

The U.S. will continue to seek market reciprocity with foreign providers and there will continue to be advocacy for greater restriction on foreign entry into U.S. markets. However, the U.S. will not become truly isolationist.

In Europe, there will be a short-term, de facto market closure as European companies seek to make greater use of European solutions. American providers that do not have strong alliances beginning in 1992 will find marketing difficult in the short term. However, with an ability to provide a broad, sophisticated set of products, opportunities will be available. Any de facto closure will be of short duration, since European businesses recognize their need for sophisticated products and to be participants in the world market.

Literacy in the use of computers and on-line data bases remains a problem. Use of on-line data bases is complex and difficult. Specific training is necessary, reducing the number of people that have effective access to on-line information. Standardized processes and simplified procedures could change the situation, but this is not expected in the near term.

ISDN continues to be an enigma. Though carriers continue to report increased availability, few specific services have been defined. Until users and carriers are able to agree on a set of specifically defined, useful services, growth of ISDN will languish.

C

Leading Network Services Vendors

There are a wide variety of network service vendors. While some indicate that they provide both (electronic) information services and applications, the majority concentrate in one area or the other. Exhibit IV-5 provides a summary of leading vendors in network services. The exhibit indicates the primary area of concentration of each vendor.

As noted from the exhibit, there are a wide range of vendors seeking to establish market position and obtain increasing shares of the market. All are faced with the same set of trends and issues.

Some vendors, recognizing that certain aspects of the market have begun to languish while others are growing, have placed increased emphasis on expanding their scope of services. Others have begun to diversify to provide information through a variety of forms.

Vendors of network services are employing a variety of strategies to maximize their opportunities. Some are broadening their base of services through acquisition and divestiture. Others are developing alternate methods of delivering their services, to make information available to a wider market.

EXHIBIT IV-5

Leading Network Services Vendors

Vendor	Services Offered	
	EIS	Applications
Automated Data Processing		X
BT/Tymnet		X
CompuServe	X	
CUC International	X	
Dow Jones	X	
Dun & Bradstreet	X	
Equifax		X
GEIS		X
Harbinger		X
IBM		X
Infonet(MCI)		X
McGraw-Hill	X	
Mead Data	X	
Quotron	X	
Redinet		X
Sprint		X
Sterling Software		X
Telecredit	X	
Telerate	X	
TRW	X	

The following profiles provide examples of how several vendors are addressing a highly competitive market.

1. CompuServe Inc.

Incorporated in 1969, CompuServe's original market was limited to consumer-oriented information services. Still oriented significantly to the consumer market, CompuServe now provides a broad range of services, including remote computing, electronic mail, value-added network services, and application and systems software products to both private and public organizations.

In addition to development of its traditional product line, CompuServe has expanded its products and services through strategic alliances and acquisitions. CompuServe now has more than 540,000 subscribers, making it one of the largest on-line information service providers for microcomputer users in the world.

Activities to broaden CompuServe's base of services include the following:

- Acquired Source Telecomputing from Readers Digest, expanding its subscriber base by an estimated 53,000
- Acquired Applied Computing of Sydney (Australia), establishing CompuServe as a leading provider of on-line services in that country
- In collaboration with Ziff-Davis Publishing, introduced an on-line service for subscribers of PC Magazine to interact with the magazine's editors and columnists
- Entered into a relationship with Radio Schweiz, a Swiss electronic information service company, further enhancing its position as a global service provider

Through these acquisitions and alliances, CompuServe has continued its strategy of expanding its subscriber base and establishing itself as a leading global provider.

2. Mead Data Central

Mead is the leading provider of legal and financial information to the legal community. With more than 230,000 subscribers, Mead is a leading provider of on-line information services.

In addition to legal information services, Mead provides full text data from more than 650 publications, including data from the medical field. Mead also provides a wide range of software and hardware to help customers make better use of available information.

Burdened with ever-expanding volumes of data, Mead began providing data on CD ROM as early as 1986, considerably before the significant growth of CD ROMs began. Today, Mead provides data on CD ROMs for both the legal and medical fields.

Mead's use of the CD ROM is indicative of a strategy to provide a variety of delivery methods to remain cost-competitive in a market needing increasing volumes of information.

3. General Electric Information Services

General Electric Information Services (GEIS) is representative of network services vendors placing emphasis on areas of opportunity that will leverage a large technological base. Key to the strategy of many vendors is identification of areas of opportunity requiring specialized expertise.

Part of GE Communications and Services, GEIS is one of six groups under umbrella of General Electric. With three computer and software development centers and 20 network service centers, GEIS provides network-based services to multinational companies in 85 countries.

As with organizations such as Tymshare (now BT/Tymnet), GEIS historically provided custom applications development through proprietary data base development tools. Applications were then run in a service bureau environment. GEIS has progressively moved from trying to meet the needs of a broad range of customers with generalized applications to providing processing solutions to specifically targeted industries.

Using its network as a delivery vehicle, GEIS provides generalized (E-mail) and specialized (EDI) solutions to specifically targeted industries such as trade and transportation, retail, banking/finance, and petroleum.

GEIS's strategy represents changes that are driving network service providers to focus on providing more complete solutions to selected industries.

D

Public Network Services Company Performance

1. 1989 Performance

INPUT examines the public electronic information services vendors separately from the rest of the processing/network services group due to the difference in the market for these services.

Electronic information services represent a newer market than some of the other processing and network services. Electronic information services include data bases, news services, and videotex services.

Growth for companies focusing on providing electronic information services has slowed since 1986, but remains above the industry average at 21% for 1989. (See Exhibit IV-6.)

EXHIBIT IV-6

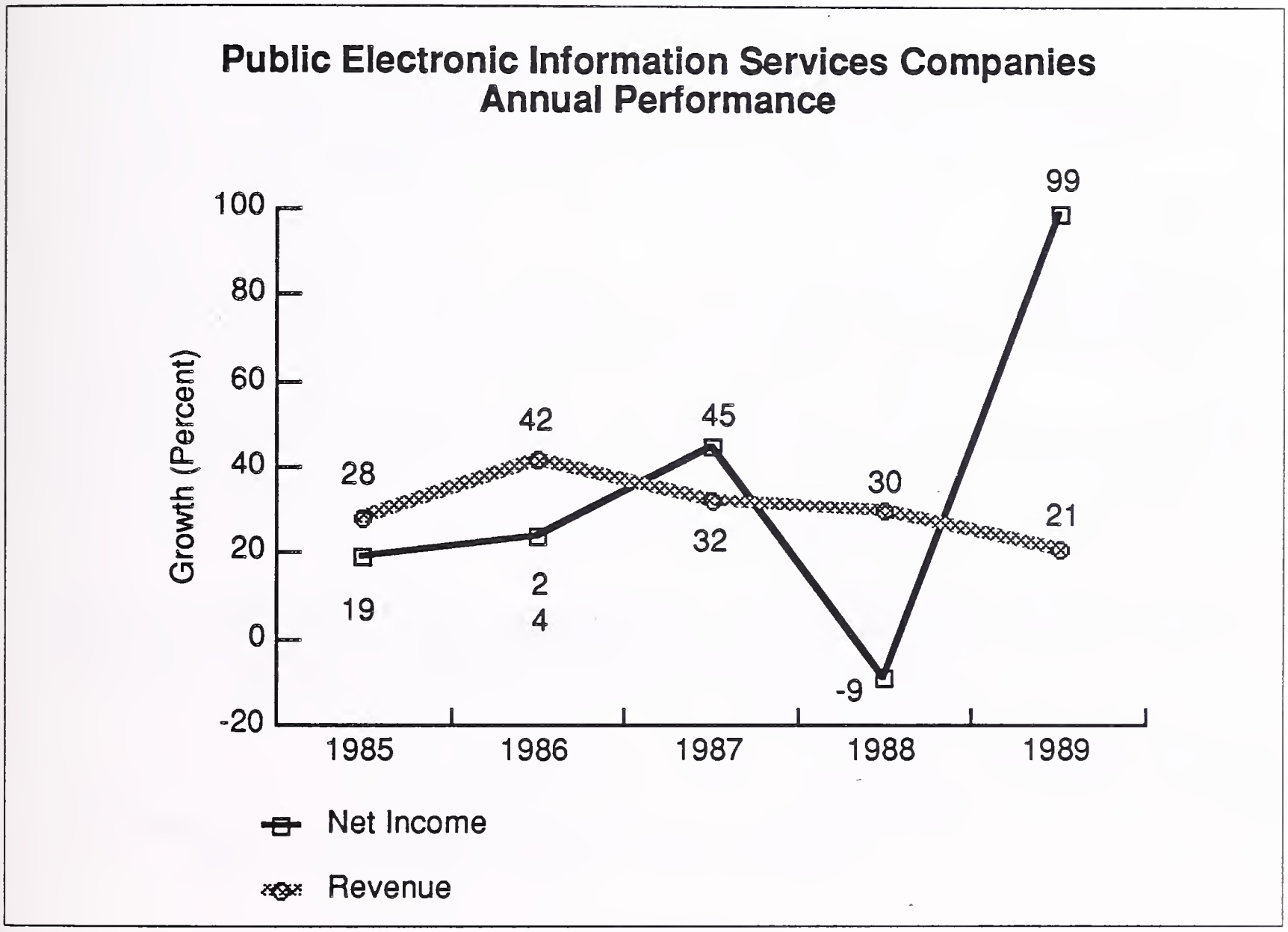


Exhibit IV-7 provides 1989 revenue and net income results by company. Telerate was the largest of the public electronic information services vendors until its remaining interest was purchased by Dow Jones in late 1989. CUC International grew 35% in 1989 and represents the most significant growth for the group as a whole.

Earnings growth has been more volatile for these vendors. Losses during 1988 and 1989 (which do not include Telerate's results) reflect charges made to operations by CUC in both 1988 and 1989, and costs associated with survey-based businesses discontinued by Information Resources during 1989.

EXHIBIT IV-7

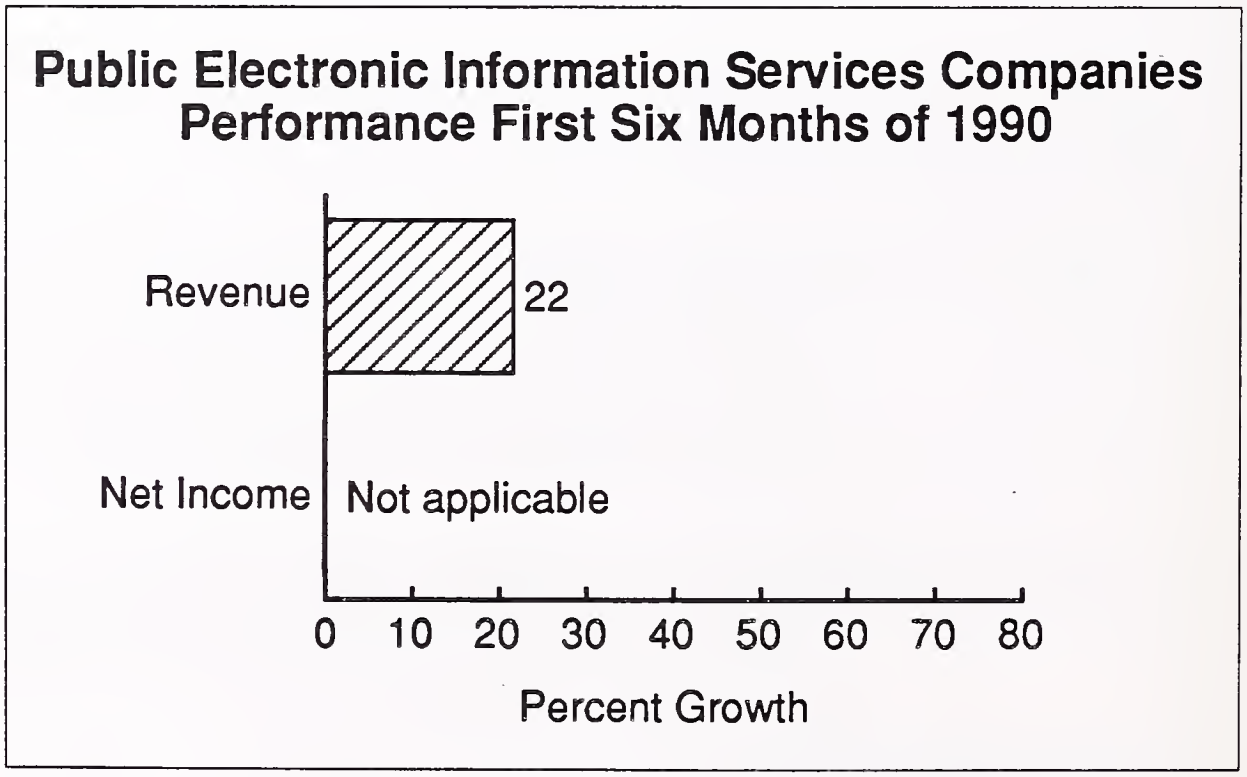
Public Electronic Information Services Companies Revenue and Net Income

Company Name	Revenue			Net Income		
	1988 ($ Millions)	1989 ($ Millions)	% Change	1988 ($ Millions)	1989 ($ Millions)	% Change
ACXIOM	68.3	84.9	24	3.8	5.7	50
CUC INTERNATIONAL	271.8	367.5 [3]	35	-11.2 [1]	8.1 [2]	172
EPSILON	53.3	47.2	-11	1.0	-2.0	-300
INFO. RESOURCES	129.2	136.4	6	0.2	-12.1 [4]	-6,150
LCS INDUSTRIES	31.1	33.4	8	0.3	0.2 [5]	-2
Total	553.7	669.4	21	-5.9	-0.1	99

2. The First Six Months of 1990

As shown in Exhibit IV-8, public electronic information services vendors experienced revenue growth of 22% for the first six months of 1990 over the same period in 1989. CUC International, now the largest of the group, grew 23%.

EXHIBIT IV-8



For the first six months of 1990, this group of companies achieved positive earnings, as compared to losses for the same period a year ago. Results for the first six months of 1989 were negatively impacted by $6.9 million in losses reported by Information Resources due to restructuring costs and losses from discontinued operations.

Epsilon has been removed from the list of public electronic information services vendors because it was acquired by American Express in 1990. Epsilon now operates as a wholly owned subsidiary of American Express.

3. Footnotes

1. CUC's 1988 results include a charge to operations of $58.9 million related to the acceleration of the amortization of membership acquisition costs.

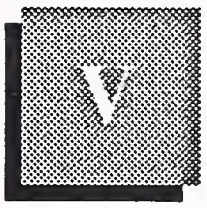
2. CUC's 1989 results include $4.3 million in recapitalization costs.

3. Epsilon's 1989 results were attributed to the loss of two major accounts early in calendar 1989.

4. Information Resource's 1989 results include restructuring costs of $5 million and a $10.7 million loss from discontinued operations, including three survey-based businesses.

5. LCS Industries' 1989 results include a $270,000 charge related to the closing of the company's Motivational Marketing Division.

Professional Services Market Analysis



Professional Services Market Analysis

A Professional Services Market, 1989

The professional services sector of the information services industry has been undergoing significant change for the past three to five years. Growing out of the needs for companies to augment their internal information systems staffs, professional services vendors have expanded their skills and service offerings to provide ever more complex systems development and implementation services. Professional services offerings in the information technology area were the foundation for the steady growth of the large accounting firm consulting practices, and have spawned the establishment of numerous reasonably large professional services firms such as Computer Task Group, Computer Sciences Corporation and American Management Systems.

In the past few years the importance of professional services has been recognized to an increasing degree by systems manufacturers and software developers.

- IBM has moved through significant changes to establish itself in this area. Today, professional services are a strategic requirement for essentially all leading information services vendors.

- DEC has become a major provider of systems implementation and systems integration services and has formed numerous alliances to foster the movement of its technology through professional services-driven marketing channels.

- Oracle, one of the most interesting corporations of the past few years, has used professional services as a key element in its strategy to achieve leadership in the relational data base management systems market.

Today, more and more product-oriented firms are broadening and strengthening their offerings, not with more products, but with professional services. Two of the most recent are Lotus Development and Microsoft.

The growth of professional services has also caused significant redefinition of the information services market structure as analyzed by INPUT and the industry in general.

- The entire systems integration market is an outgrowth of the professional services area. As these firms became proficient and strong enough to take on the entire responsibility for complex systems projects, a new market (delivery mode) was formed. In 1987, INPUT first recognized systems integration as a separate delivery mode (market), which in 1989 was $5.9 billion in size. Systems integration is discussed in Chapter VI.

- Professional services is also a factor in the creation of the systems operations delivery mode. Facilities management has long been one of the service offerings of many professional services firms. In 1989, this service offering (including systems operations offerings from processing services firms (see Chapter III)) was separated into a new delivery mode. Systems operations and systems integration are both professional services-type offerings, but with significantly increased management content.

In spite of these changes, professional services was the largest delivery mode of the U.S. information services industry in 1989. As shown in Exhibit V-1, the U.S. professional services market reached $16 billion, or 18% of the total information services industry.

During the next five years, the professional services market will grow from $18.2 billion to over $32 billion by 1995, at a CAGR of 12% (see Exhibit V-2). As industry and large public organizations continue to struggle to maximize their use of information technology—while controlling fixed costs and internal staff size—they will continue to turn for assistance to both large and small professional services firms.

EXHIBIT V-1

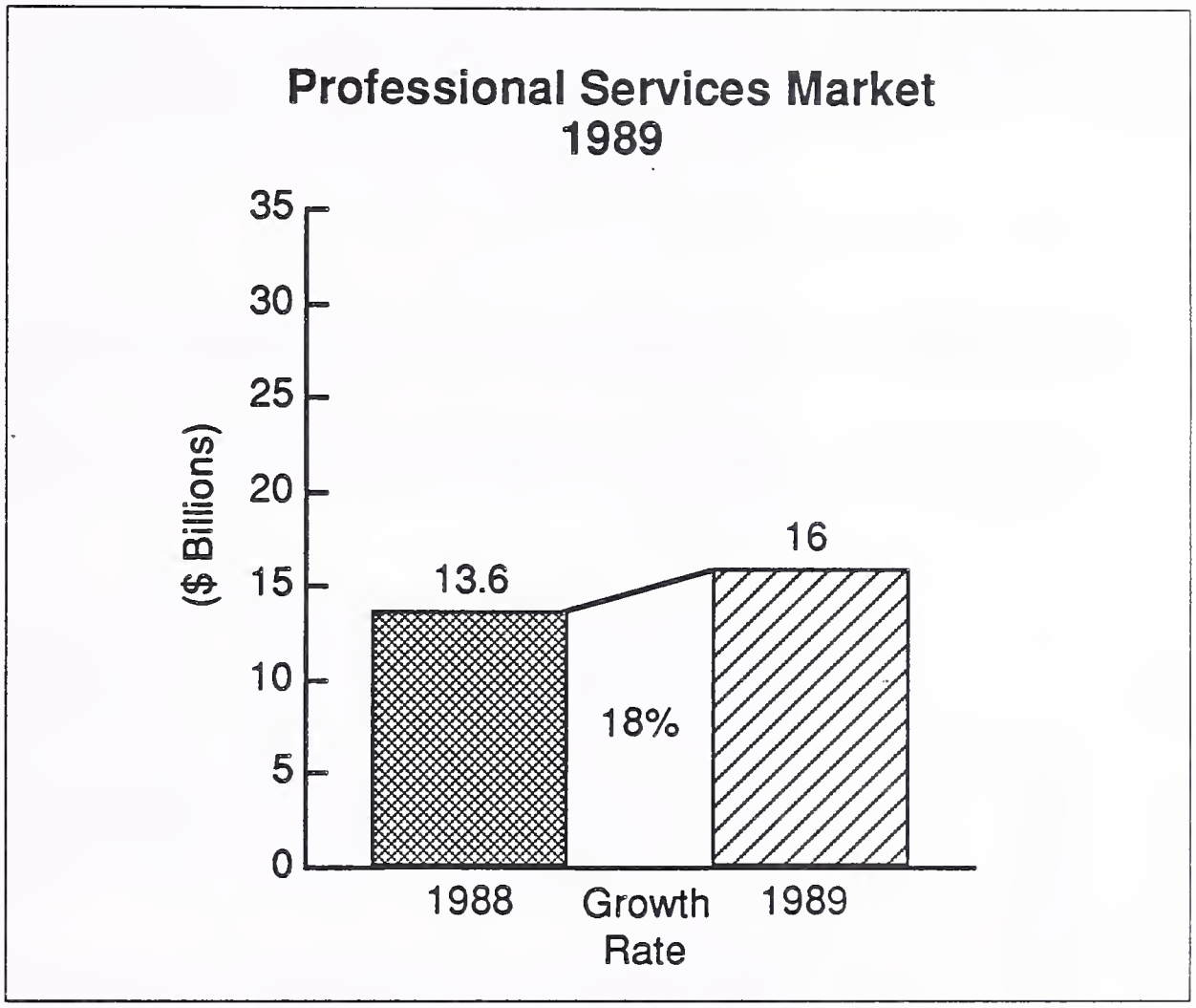
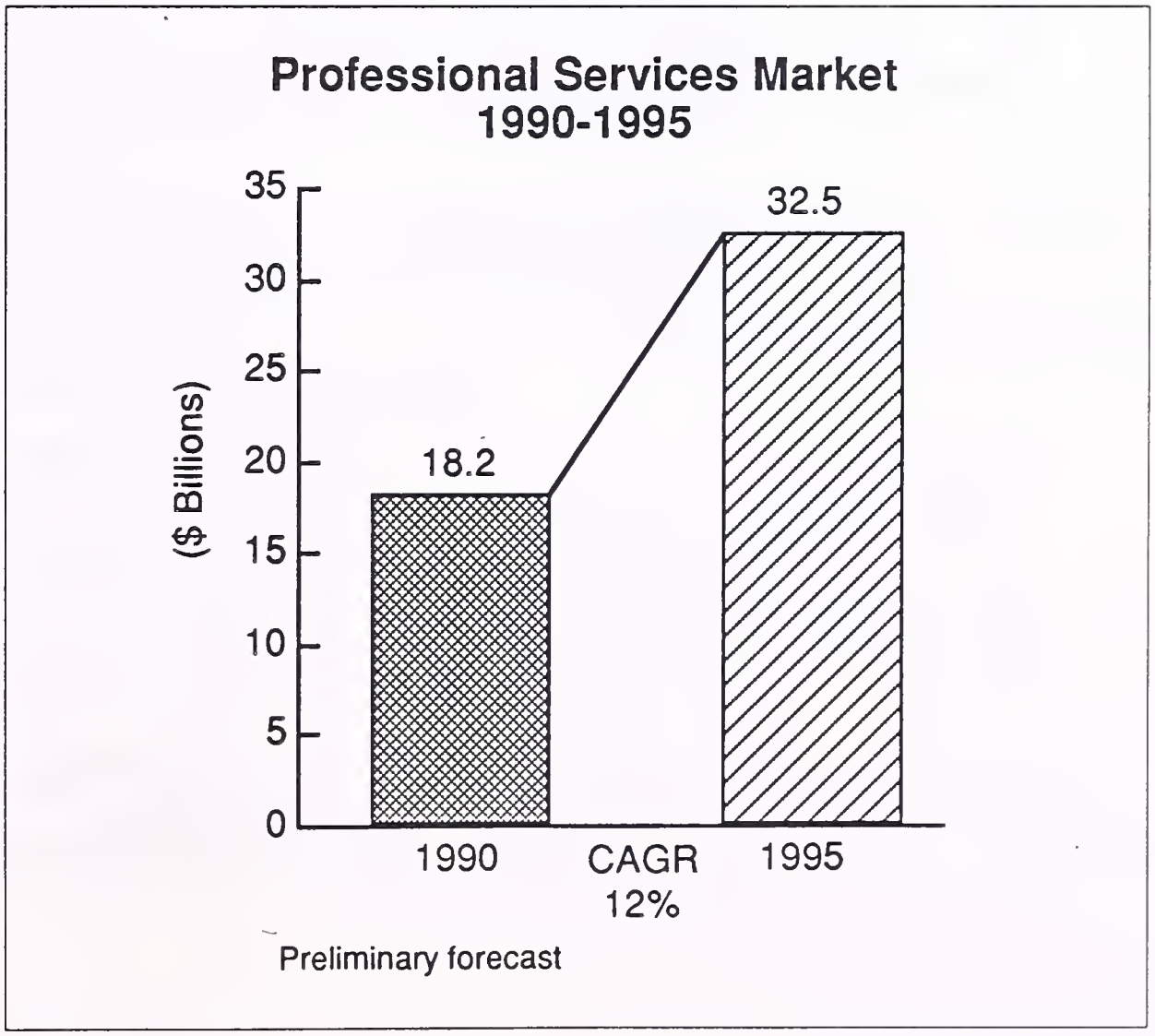


EXHIBIT V-2



B

Professional Services Market Trends and Issues

The main driving force in the core professional services market remains the inability and unwillingness of corporations to add permanent technical staff to their information systems organizations. This factor is self-evident for short-term projects; however, it is increasingly true for longer-term projects as budgets become tighter and there is more uncertainty over corporate direction.

Related to the inability/unwillingness to add salaried staff is the flexibility associated with using professional services firms: contract staff is available at short notice and, depending on contract terms, use of such staff can be stopped on short notice. Some vendors also offer the added flexibility of allowing the customer to later hire contract staff as full-time employees.

The alternatives provided by today's information technology simply exceed the skills of most of today's information systems organizations. They just can't maintain an awareness of the possibilities, let alone have the skills to master those technologies chosen for use. The solution in many cases is to turn to an outsider to bring the technology into a company in the time period required. The internal staff then has the time to learn, or decides to use the outside professional services firm to operate the system.

The need for technical skills across a wide spectrum of application, technology and product knowledge is a continuing requirement in this market: as IS operations become more complex, it becomes increasingly difficult for IS departments to assign permanent employees to such roles, especially since many activities are not full-time in nature. Contracting for specialized skills on an as-needed basis is often the solution.

Exhibit V-3 summarizes the major driving forces impacting the professional services market and leading to ever-expanding opportunities.

EXHIBIT V-3

Professional Services Market Driving Forces

- Customer inability/unwillingness to add staff
- Flexibility: short-term
- Increasing complexity of technology
- Skills: application and technical

Other forces also driving the growing use of professional services firms for information systems requirements include the increased merger and acquisition activity and the ever-increasing involvement of operations management in the information systems process.

- Consolidation brings unplanned information system requirements.
- IS decisions made by operations management often changes the immediacy of the requirement and the willingness to look at all alternatives.

All markets also have negative forces containing or inhibiting growth. Exhibit V-4 identifies the key growth inhibitors for the professional services market.

EXHIBIT V-4

Professional Services Market Growth Inhibitors

- Customer uncertainty
- Systems integration
- Diverse buying points: decline of IS influence
- Pressure to offer higher value services
- Requirement for software product offerings

In the discussion on driving forces, customer inability or unwillingness to hire permanent staff was cited as one of the forces propelling professional services. There is, however, another aspect of this which also acts as a market inhibitor: customer uncertainty over business conditions and systems planning can, past a certain point, act as a market inhibitor.

For example, firms that are experiencing poor financial performance or are doubtful concerning general trends in the economy will often use outside professional services until their underlying business improves. If, however, uncertainty reaches a point where basic system planning/ approvals come to a halt (as in some acquisition/divestiture situations, for example), then the use of external professional services will decrease.

A longer-term inhibitor is the replacement of professional services by systems integration services. To some extent this may be viewed as a classification issue, where the same service is performed (e.g., modifying an applications software package).

- Where contracted directly by the customer as an individual task, this activity would be classified as professional services.

- Where part of a larger project that encompasses package selection, recommending modifications, planning and supervising the transition, modifying the package and providing post-installation training and support, the task would be part of a systems integration project.

Related to the systems integration issue is the fact that buying points for information services within an organization are becoming more dispersed. No longer do most projects automatically flow through IS. While this is most applicable to systems integration projects, it is also becoming a factor in larger professional services contracts. As customer organizations become more decentralized and as P&L responsibility is driven deeper into an organization, IS responsibilities become more fragmented as well.

In response to these trends, many professional services firms are under pressure to offer higher value services (consulting, fixed price contracts, systems integration, project management). Upgrading of offered services in this manner may be inevitable for many professional service firms; however, in the short term it may serve as an inhibitor to the growth of more traditional professional services firms as the firm's resources and focus are directed at developing new capabilities such as project management. In addition, more time will have to be spent on staff training in general, which will make staff less available for contract assignments.

Combined with the pressure for more complete services is the desire to turn to a single vendor of the application software and implementation support. This requirement has driven some professional services firms to enter the software market (Andersen Consulting is a prime example), application software firms to greatly strengthen services offerings, and most important, for the software and professional service vendors to form a growing number of alliances. Some of these alliances are likely to turn into partnerships or, over time, mergers.

C

Leading Professional Services Vendors

Exhibit V-5 lists leading professional services vendors. Included are vendors serving both the commercial and governmental segments of the professional services market. This list represents the larger of the diverse collection of professional services vendors that serve the information services marketplace.

EXHIBIT V-5

Leading Professional Services Vendors Commercial and Government

- American Management Systems
- Andersen Consulting
- Bolt Beranek & Newman
- Computer Sciences Corporation
- Computer Task Group
- Control Data
- Coopers & Lybrand
- Deloitte & Touche
- Digital Equipment
- Electronic Data Systems
- IBM
- Logicon
- McDonnell Douglas SI
- Unisys

The following profiles provide examples of how professional services vendors are addressing the challenges of this market sector.

1. Analysts International Corporation (AIC)

Analysts International Corporation has maintained strength in contract services and system development on a range of hardware and software so that it can move into market areas of opportunity and take on new types of assignments in banking, manufacturing, telecommunications, insurance and other market sectors.

The company has extensive experience in designing and implementing systems on a number of large- and small-scale computers using different operating systems, DBMS and other sophisticated systems software and application packages. Its capabilities with different hardware and software, including IBM's AS/400 and RS6000 systems, have enabled AIC to obtain a number of contracts, including work with IBM.

AIC adds to its technical capabilities by handling contracts such as the development of testing programs for Motorola to use with integrated circuits, and work that will make use of its software engineering laboratory. The company has taken on assignments involved with the use of CASE, just as AGS, DMR, CGA and other firms offering professional services have done during the last few years.

AIC supplements its development capabilities with education and training on systems and application software products aimed at the financial marketplace.

2. CAP Gemini America (CGA)

CGA, the American subsidiary of CAP Gemini Sogeti, is more devoted to the professional services market than many other vendors of these services: 90% of its revenues are from professional services and 10% from systems integration which involves the use of professional services.

CGA has particular expertise in systems conversion and methodology. In 1989, it acquired Compact Data Systems, a leading firm in DOS-to-MVS conversion. CGA has also converted growing financial applications from a small-scale computer using BASIC to an IBM mainframe and from IBM equipment to DEC minicomputers.

CGA has taken a comprehensive approach to methodology as a number of other professional services firms, such as Andersen Consulting and DMR, have done. CGA utilizes its methodology in development, integration and conversion assignments as well as in the use of CASE. As a result of this work, IBM has selected CGA as one of its service providers for the AD/Cycle. CGA will provide training, installation and consulting services in support of AD/Cycle.

CGA has broad coverage of markets in the U.S., with 50 branch offices organized within 14 regions. It serves the banking and finance, insurance, telecommunications, manufacturing, transportation, and other markets.

3. Computer Task Group (CTG)

Computer Task Group is one of the largest vendors of professional and systems integration services to the commercial market in the U.S. In a similar fashion to other large providers of these services such as EDS and AMS, CTG has developed significant expertise in certain vertical markets. For CTG, these include the discrete manufacturing and banking/financial markets.

CTG can support large-scale assignments for major corporations with multiple sites as well as small tasks. Its staff can run major systems projects or become part of the client's on-site development team. As a result of its industry knowledge and ability to handle major projects, IBM made an equity investment in the company and utilizes systems engineers from CTG on products that it is developing for internal use as well as with customers.

CTG was restructured in 1989 to consolidate functions and reduce field operations from 71 to 60 offices. An office in Ottawa, Canada was closed and a subsidiary, Amtec, was sold in order to improve operating margins.

The current strategy of the firm is to concentrate on commercial professional services and systems integration activities, with a view towards international opportunities as well as its IBM relationship.

D

Public Professional Services Company Performance

1. Commercial Professional Services Companies

a. 1989 Performance

As shown in Exhibit V-6, growth for the commercial professional services vendors has slowed somewhat during the past three years. Revenues for commercial professional services companies increased 13% from 1988 to 1989.

Results for 1989 were much more consistent among the commercial professional services vendors, with all companies achieving revenue growth during the year. The largest increases were achieved by Analysts International and Keane. Computer Task Group, the largest of the commercial professional services companies, grew 7% during 1989.

Earnings for this group have fluctuated. Earnings declined 31% during 1989, after growing 62% during 1988 on top of 1987 growth of 244%. The 1989 declines were due primarily to the results of Computer Task Group, which included expenses of $17.4 million for certain restructuring and closing of unprofitable branch offices.

Profitability for the commercial professional services group was well below average and even lower than for the government professional services group in 1988. Commercial professional services companies earned only 1.7% of revenues on average for the year.

EXHIBIT V-6

Public Commercial Professional Services Companies—Annual Performance

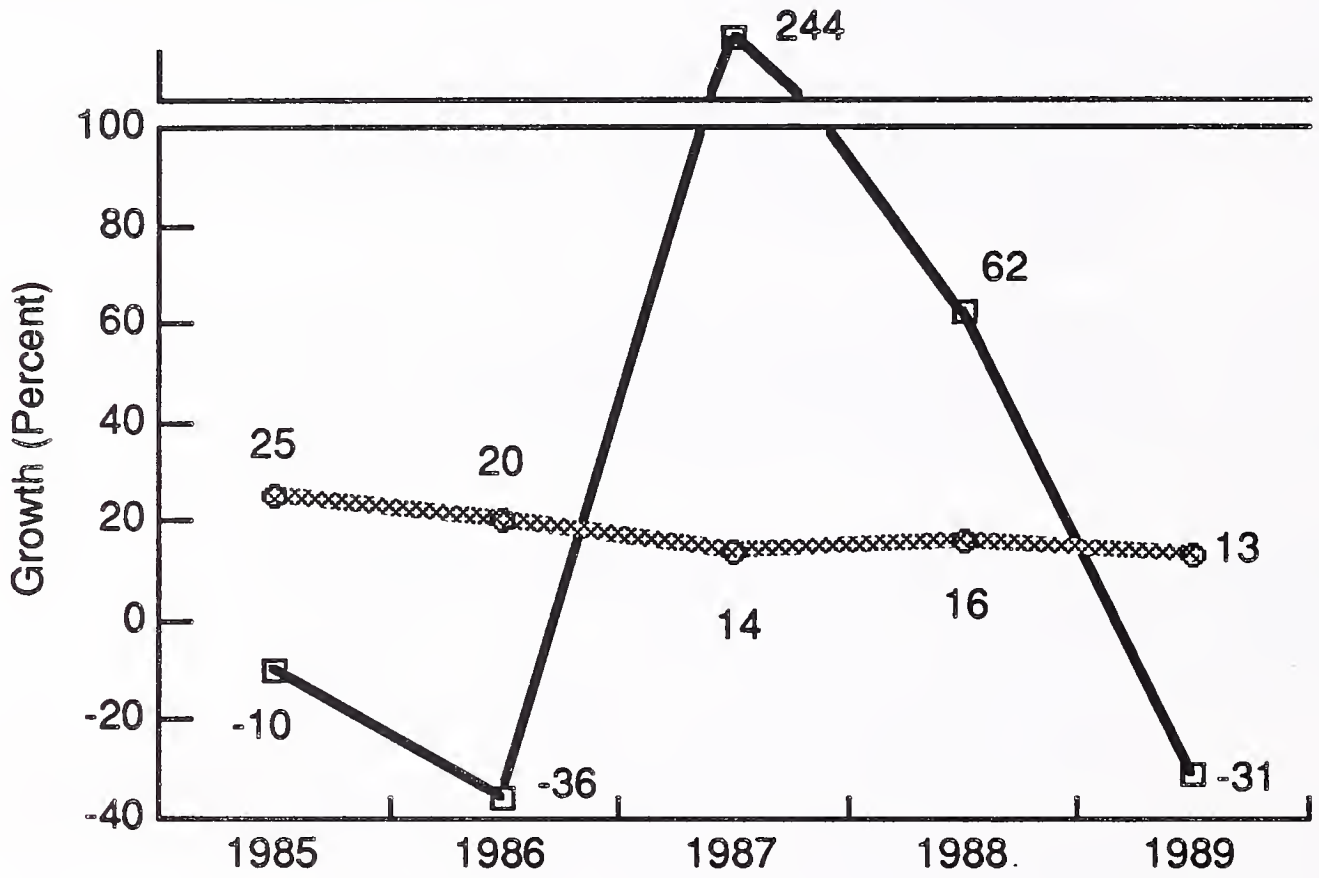


Exhibit V-7 provides 1989 revenue and net income results by company.

Note that Advanced Computer Techniques was removed from the list of public professional services vendors, since the company's professional services business was spun off into a joint venture. Technowlege also was removed due to its merger in 1989 with American Cimflex.

EXHIBIT V-7

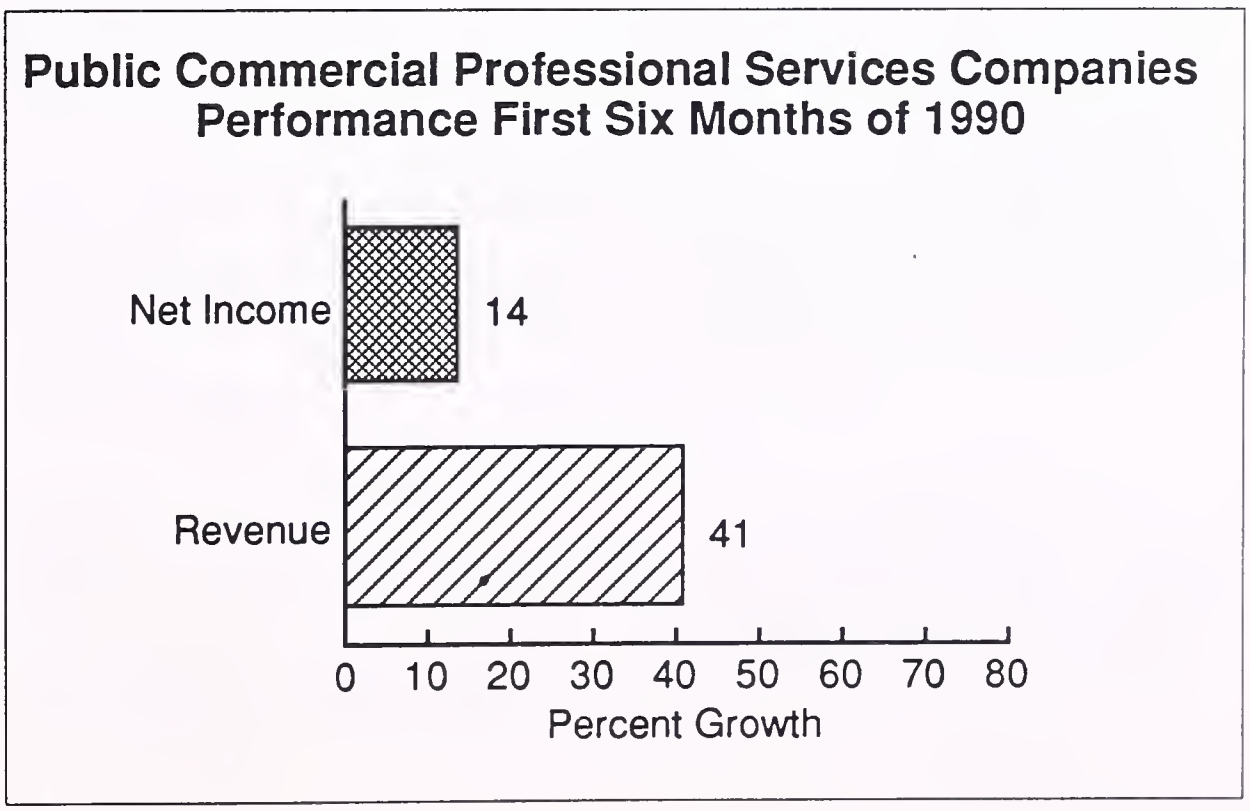
b. The First Six Months of 1990

Public Commercial Professional Services Companies Revenue and Net Income

Company Name	Revenue			Net Income		
	1988 ($ Millions)	1989 ($ Millions)	% Change	1988 ($ Millions)	1989 ($ Millions)	% Change
ANALYSTS INTL.	78.7	98.9	26	3.7	5.4	46
BRANDON SYSTEMS	27.9	30.6	10	2.1	2.0	-5
COMP. HORIZONS	79.1	84.7	7	1.3	-0.3 [1]	-123
COMP. TASK GROUP	218.7	233.0	7	6.5	-7.8 [2]	-220
CONTINUUM	67.2	75.1	12	0.1	3.1	3,000
KEANE	60.0	77.2 [3]	29	2.8	3.6 [3]	29
SYS. & COMP TECH.	37.3	44.5	19	-1.6 [4]	3.4	313
TECHNALYSIS	17.7	20.7	17	1.7	2.0	18
Total	586.7	664.7	13%	16.6	11.4	-31

As shown in Exhibit V-8, revenue growth for the first six months of 1990 for public commercial professional services vendors was 14% over the same period in 1989. Revenue growth was achieved by all vendors in this category, except Computer Task Group, whose revenues declined slightly.

EXHIBIT V-8



Earnings for this group increased 41% as compared to the first six months of 1989. Strong growth was reported by Computer Task Group (80%) and Keane (47%). Profitability for the group rose to 4.7%, as compared to 3.8% for the same period a year ago.

Profitability for the group for the first half of the year was 4.7%, compared to 3.8% for the first half of 1989.

c. Footnotes

1. Computer Horizons' 1989 results include restructuring charges of $3.3 million associated with a plan to reduce costs. Actions included the closing and consolidation of certain offices, work force reductions, and other write-offs.

2. Computer Task Group's 1989 results include expenses of $17.4 million for certain restructuring and closing of businesses. In the second quarter of 1989, the company closed four branches which were unprofitable and eliminated 65 overhead positions. In the fourth quarter, the company incurred expense and set up reserves of $13.6 million as a result of restructuring efforts to overcome disappointing results in certain areas.

3. Keane's 1989 results include the operations of Computer Consultants, Database Management Systems, and Mezaros Associates (ComPro) from their respective dates of acquisition in 1989.

4. Systems & Computer Technology's 1988 results were attributed to lower revenues, combined with continuing investments in product development.

2. Government Professional Services Companies

a. 1989 Performance

As shown in Exhibit V-9, growth for government professional services vendors has been moderate for most of the past five years. Revenues for these companies grew an average of 9% in 1989, compared to 10% in 1988 and 16% in 1987.

EXHIBIT V-9

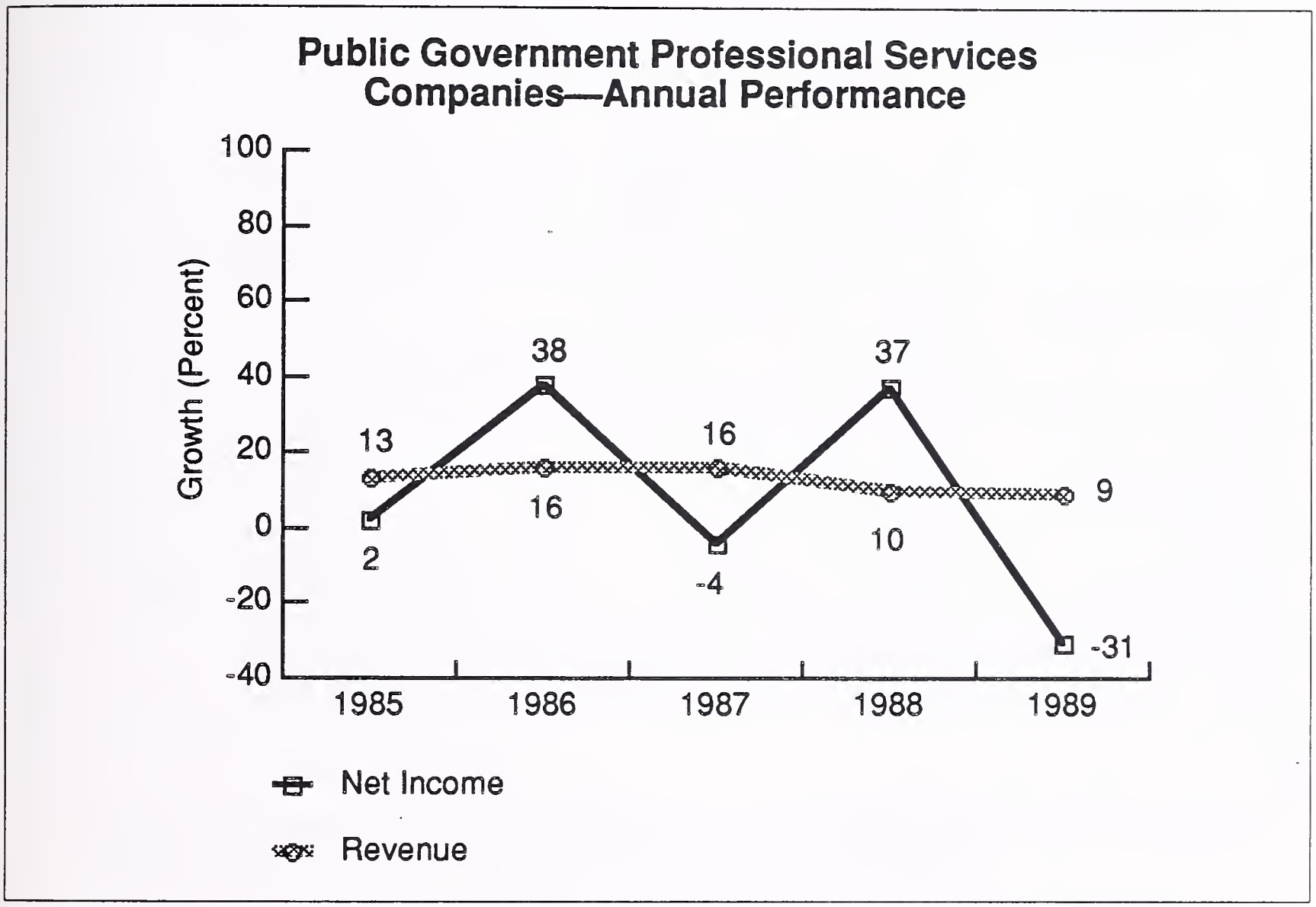


Exhibit V-10 provides 1989 revenue and net income results by company.

Professional services for the government represents a mature market targeted by several large vendors, the largest being Computer Sciences Corporation. In 1989, Computer Sciences generated revenues in excess of $1.4 billion, equal to growth of 15% for the year. Other large government professional services firms include American Management Systems (AMS), Bolt Beranek & Newman (BBN), C.A.C.I., Logicon, and Sterling Software. Of the entire group of companies, Computer Data grew the fastest in 1989 (56%), benefitting from contract wins from the Department of Energy and GSA awarded during late 1988.

The group experienced a 31% decline in earnings during 1989. The decrease was primarily due to the results of BBN, whose losses were attributed to the poor performance of its BBN Advanced Computers unit and its Communications subsidiary. For the year 1988, earnings growth for the group was 37%, compared to a drop in earnings of 4% in 1987 and an increase of 38% in 1986.

EXHIBIT V-10

Public Government Professional Services Companies
Revenue and Net Income

Company Name	Revenue			Net Income		
	1988 ($ Millions)	1989 ($ Millions)	% Change	1988 ($ Millions)	1989 ($ Millions)	% Change
AMER. MGMT SYS	213.3	225.3	6	7.3 [1]	6.2	-15
BBN	302.1	274.1	-9	12.4	-34.2 [2]	-375
C.A.C.I.	144.3	142.6	-1	4.2	3.2	-24
COMPUTER DATA	78.3	122.3 [3]	56	1.5	2.4	60
CSC	1,253.4	1442.8	15	49.6	58.4	18
DYNAMICS RES.	92.9	88.5	-5	4.1	3.6	-12
INTERMETRICS	48.9	46.7	-4	2.6	2.0 [4]	-22
LOGICON	231.0	254.2	10	8.9	8.6	-3
SOFTECH	46.5	48.7	5	1.1	1.5	36
STERLING S/W	178.8	184.4	3	0.7 [5]	11.0	1,569
TELOS	112.2	124.7	11	3.0	2.8	-7
Total	2,701.7	2,954.3	9%	95.4	65.5	-31

Profitability for government professional services vendors is well below average for information services vendors overall. In 1989, the group earned 2% in revenues.

b. The First Six Months of 1990

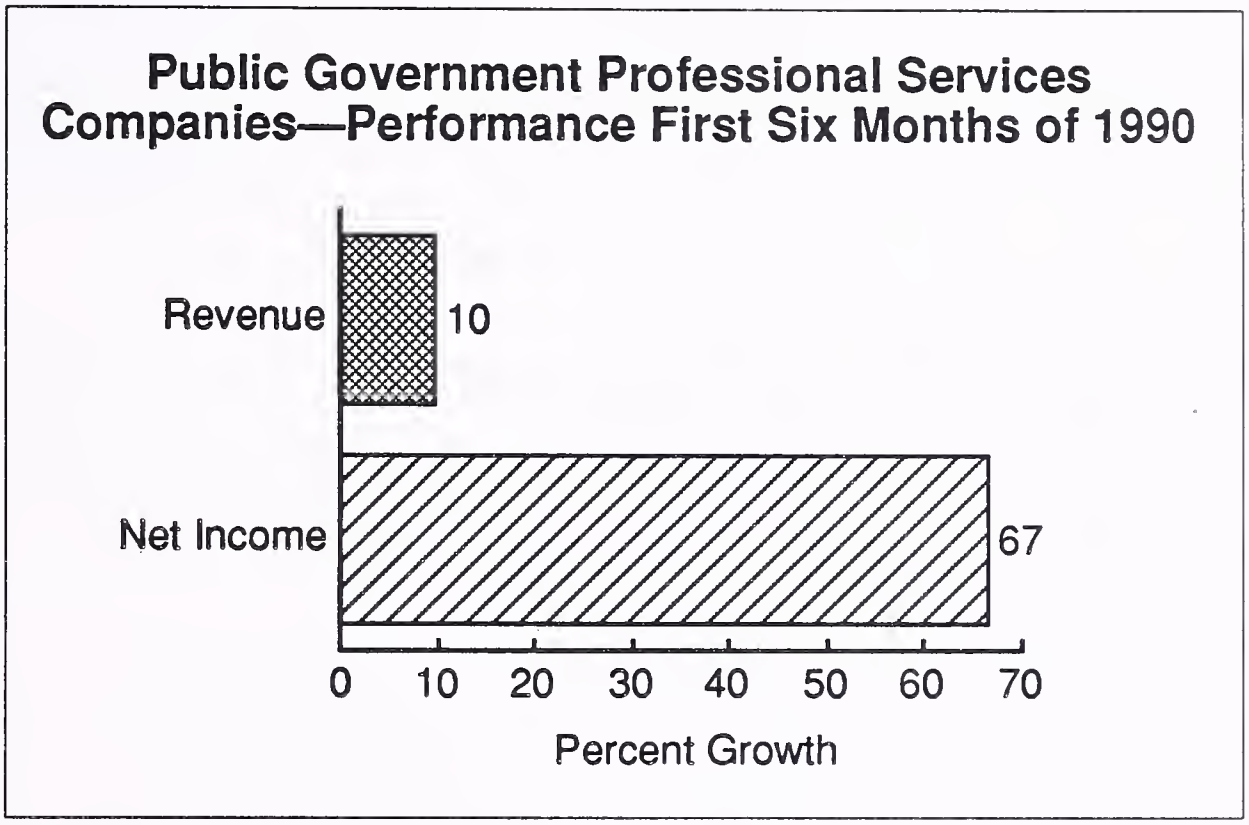
As shown in Exhibit V-11, revenue growth for public government professional services vendors remained moderate for the first six months of 1990. Revenues for these companies increased 10% over the same period in 1989.

Of the group, Computer Sciences Corporation grew the fastest (17%), with the largest growth occurring in its commercial and international markets.

Earnings for the group increased 67% compared to the first six months of 1989, despite continued losses reported by Bolt Beranek & Newman. Significant gains were reported by Computer Sciences, American Management Systems, and Sterling Software.

Profitability for the group was 1.9% for the first half of 1990, compared to 1.2% for the first half of 1989.

EXHIBIT V-11



Telos was removed from the list of public professional services vendors because it was acquired by Contel in February 1990 and now operates as a wholly owned subsidiary of Contel Federal Systems Corp.

c. Footnotes

1. BBN's 1988 net income includes $6.4 million from the cumulative effect of a change in the method of accounting for income taxes.

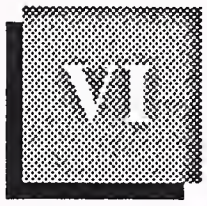
2. BBN's losses in 1989 were attributed to the poor performance of BBN Advanced Computers, cost overruns for a communications network for Japan Air Lines, and a restructuring charge of $5.1 million related to certain manufacturing operations.

3. CSC's results include the operations of Compufact and Infonet through March 31, 1989. Compufact was sold in early 1989 and CSC reduced its ownership of Infonet to a minority interest in January 1989.

4. Intermetrics' 1989 profit declines were attributed to lower revenue, reflecting the slower pace of spending by the U.S. Department of Defense throughout the year.

5. Sterling's 1988 results include losses (net of applicable income taxes) on disposals of discontinued operations of approximately $8.0 million. Businesses sold or discontinued during 1988 included the North American and international commercial professional services operations and Check Consultants, Inc.

Systems Integration Market Analysis



Systems Integration Market Analysis

A Systems Integration Market, 1989

Systems integration (SI) is a business offering that provides a complete solution to a complex information system, networking, or automation requirement, through the custom selection and implementation of a variety of information products and services.

A system integrator is responsible for overall management of a systems integration contract. The integrator is the single point of contact and is responsible to the buyer for system function, performance, schedule, cost, and final delivery.

It is critical to the success of the approach that there be a sharing or total transfer of responsibility (and risks) from the client organization to the vendor. In exchange for assuming the risks of failure to deliver the desired solution on time and within budget, the integrator receives project management fees from the client.

The range of components in an SI project can include systems design, programming, equipment selection, communications and network management, hardware and software installation, and education and training. Some or all of these elements may be included in the integration service. Typically, a single vendor assumes full responsibility for the project, though several vendors may be involved as suppliers or subcontractors to the prime vendor.

Exhibits VI-1 shows the growth of the SI market from 1988 to 1989, and Exhibit VI-2 projects its growth from 1990 to 1995. In 1989, the systems integration market grew 23%, reaching $5.9 billion in the U.S. Over the next five years, 1990 to 1995, INPUT projects the market will continue to grow at a rapid 24% compound average growth rate, reaching $21 billion in 1995. Systems integration is the fastest growing segment of the information services market.

EXHIBIT VI-1

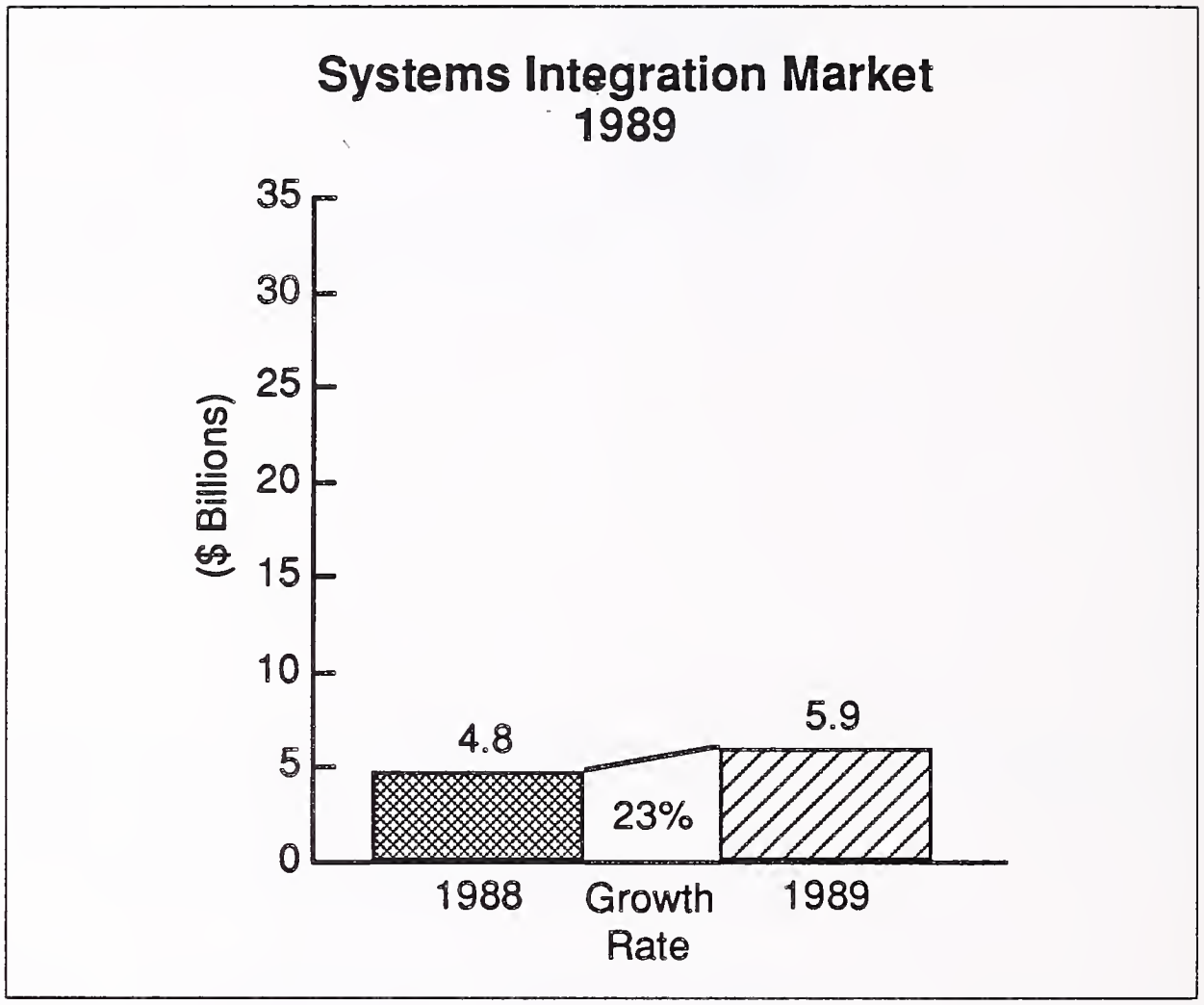
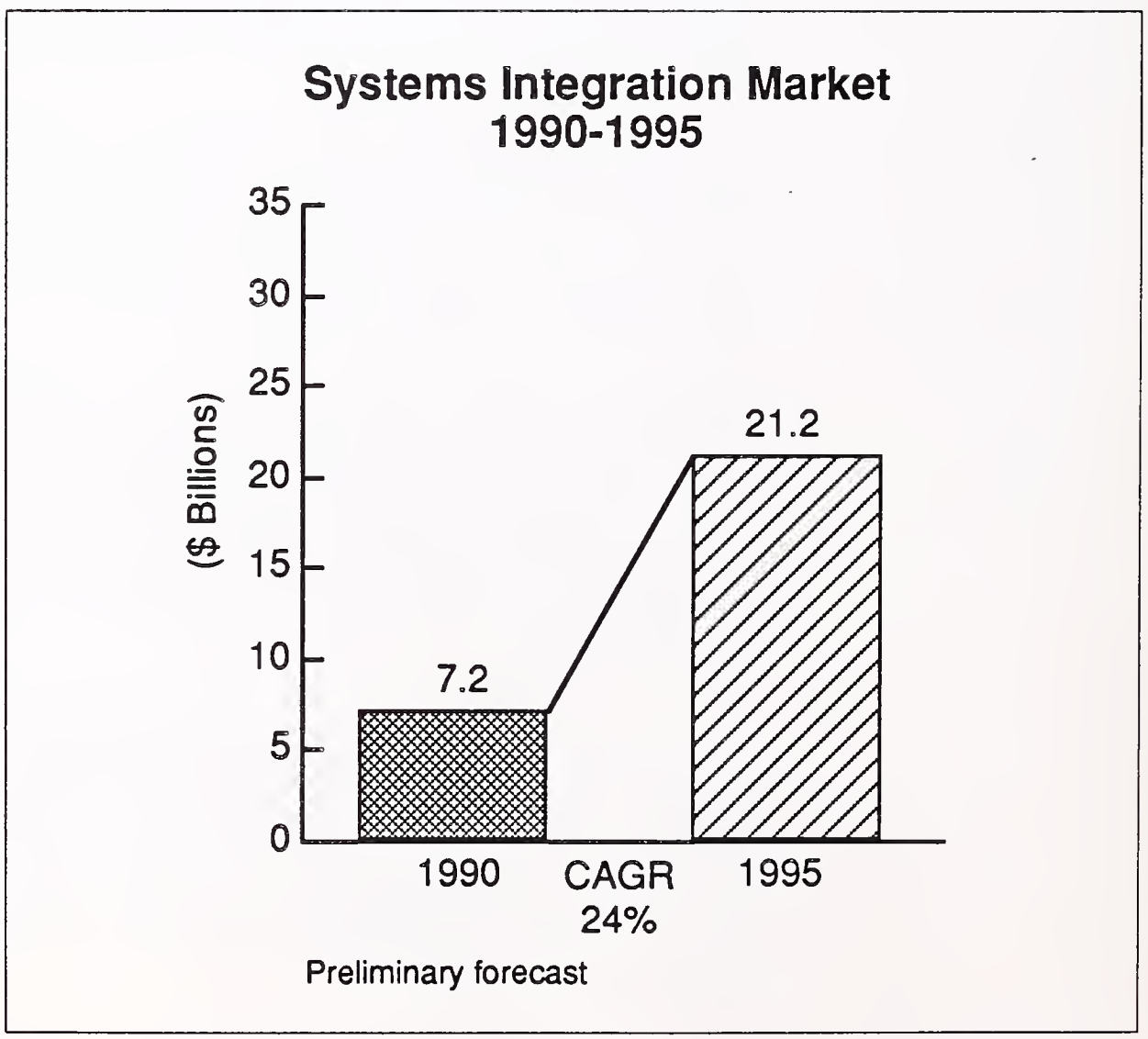


EXHIBIT VI-2



INPUT segments the systems integration market into commercial and federal sectors, and the commercial market into fourteen vertical industry markets. The commercial market will grow significantly faster than the government sector over the next five years. This is due in part to the effect of impending budget reductions in the government. Other factors impacting the respective growth rates will be discussed later in this sector analysis.

B

Systems Integration Market Trends and Issues

In assessing the driving factors and growth inhibitors that dominate the systems integration market today, a distinction must be made between the federal and the commercial sectors, since different motivating forces are at work in each market.

Exhibit VI-3 lists the driving forces within the commercial and federal systems integration markets.

EXHIBIT VI-3

Systems Integration Market Driving Forces

- Commercial market
  - Rising demand for connectivity
  - Major rebuilding of infrastructure
  - Growing user management trend
  - Global competitive pressure
  - Growing complexity of applications
- Federal market
  - Demand for productivity improvement
  - Shortage of technical staff
  - Shared implementation risks
  - Trend towards technology upgrades

In the federal sector, mounting concern about the ability to recruit and retain qualified information technology personnel is making the contracting of design, development, integration and implementation of new systems to external vendors more attractive. This is in spite of some bad experiences in some of the early systems integration projects, where major cost and schedule overruns made trade journal headlines.

The obsolescence of much of the federal government's processing capacity, coupled with budget pressures, is creating an urgent need to upgrade using all the advantages new technology can bring. Federal SI projects are often large and complex and well beyond the limited technical capabilities and resources of the agencies that seek to accomplish them. Government executives prefer to share the risks inherent in implementing new technology with the contractor, and SI provides a way to do this.

In the commercial sector, some of the same forces are at play, but there is also increasing awareness that data processing resources are a strong tool in meeting the competitive pressures in the marketplace. Management is more concerned than ever with global connectivity and rapid access to information. These demands often require new technologies that in-house staff are not familiar with. It becomes more attractive to acquire them on a contract basis from outside vendors with a recognized experience base in a particular field.

The inhibitors to growth in the marketplace, as listed in Exhibit VI-4, are different for the federal and commercial sectors also.

EXHIBIT VI-4

Systems Integration Market Growth Inhibitors

- Commercial
  - In-house competitive threat
  - Growing concern over maintenance issues
  - Organizational instability
  - Wait-and-see track records
- Federal
  - Deficit and budget pressures
  - Systems maintenance resource burden
  - Slow standards implementations
  - Extended implementation schedules

In the federal sector, the same budget pressures that often act as a spur to system integration projects can, in other instances, delay the decision to begin such a costly project. Reduced operating budgets may be largely earmarked for maintaining systems that are obsolete, leaving very little funding for new programs. When new projects are eventually proposed, the history of previous major cost and schedule overruns on federal integration contracts causes extended and much delayed procurement schedules.

Some basic attitudes hinder the implementation of integrated systems. In some major organizations, corporate management views the in-house staff as qualified and sufficient to plan and execute important information system improvements. Though some organizations do have the skills to implement complex systems, many are overloaded with the maintenance and operation of existing applications, and/or lack the skills to integrate new technologies or implement advanced applications.

Also detracting from a decision to employ a systems integrator is the concern about maintaining software programs developed by others. Although this might have been a concern in the past, years of professional services experience and proven documentation techniques should override this consideration.

Organizational instability, the bane of many medium-sized and large businesses, can delay plans to upgrade or replace existing data processing resources indefinitely. A "wait and see" attitude about the cost and success of systems integrators is likely to be the most difficult obstacle for vendors to overcome.

The systems integration market will continue to grow in the 1990s. Though the motivations of the decision makers will be different in the commercial and the government sectors, the driving forces continue to exist.

- Technology upgrades are more and more necessary, particularly in the government sector where higher productivity must be attained in the face of budget cuts.

- The pool of skilled practitioners continues to be unable to fill requirements; it may in fact be shrinking.

- As the user becomes more involved in the decision to acquire data processing resources, the reluctance to contract out for the development and operations of these services will decrease.

Vendors with demonstrated successes in the implementation and installation of new systems will be well positioned to be successful in the 1990s. They should be prepared to enter the area of systems operations also, a natural outgrowth of many systems integration contracts.

C

Leading Systems Integration Vendors

Exhibit VI-5 identifies the major systems integrators participating in the commercial and federal SI markets.

EXHIBIT VI-5

Leading Systems Integration Vendors

- IBM
- Andersen Consulting
- EDS
- Computer Sciences
- Digital Equipment
- Unisys
- SAIC
- Martin Marietta
- Control Data
- Boeing Computer Services
- Grumman Data Systems
- McDonnell Douglas

The following profiles of successful systems integrators briefly describe the characteristics of this vendor category. Two vendors in the commercial market sector and one in the government sector have been selected.

1. Electronic Data Systems (EDS)

EDS provides systems integration services to a broad set of markets, both in the commercial and federal sectors. It also extends its activities into the systems operations market, since it has a long history of facilities management contracts.

EDS was originally founded in 1962 by Ross Perot to provide facilities management services to insurance companies, government-funded health insurance programs, and financial institutions. Its marketing focus on systems integration was a natural evolution of a policy to do the front-end work that led to facilities management contracts.

Sold to General Motors in 1984, EDS is a leading communications and information services company with over 6,000 clients worldwide. It also provides virtually all information processing services to General Motors.

In late 1989, a complete reorganization was implemented which restructured the company into nearly 50 units concentrating on internal GM organizations and activities, and on commercial vertical market segments. It has been, and continues to be, a major player in the SI marketplace along with IBM, DEC and Andersen Consulting.

It currently provides systems operations, processing services, professional services, and systems integration services to nearly all vertical industries and to the federal government, as well as state and local governments.

Its worldwide revenues in 1989 were $5.47 billion, 45% of which were derived from non-GM clients. Approximately $500 million of its noncaptive revenues were derived from systems integration activities.

EDS operates 21 information processing centers worldwide, as well as operating centers on numerous client premises. In addition to systems integration, EDS derives revenue from a number of other synergistic services ranging from remote processing for clients to systems operations services, which often evolved from earlier systems integration contracts.

EDS has excellent technical consulting capabilities based on its extensive systems operations experience. This capability should provide particular strength in its base service businesses, i.e., process and discrete manufacturing, federal government, state and local government, banking and finance, and insurance.

The company generally uses off-the-shelf hardware provided by other computer manufacturers, though it will most likely incorporate more Hitachi/NAS products in its proposals because of its recently acquired equity interest in that manufacturer. The systems integration organization indicates that it has some custom hardware capability, but would clearly prefer to use standard products.

EDS has extensive experience in developing and managing communications networks for GM and supporting its own remote processing capability. Today it operates one of the largest networks in the world.

EDS has a formal alliance program that generally operates on a contract-by-contract basis. These alliances exist with:

- Computer hardware manufacturers, such as IBM and Tandem
- Customers such as GM-Hughes Electronics and Bank One
- Applications software providers such as Ameritech for system software

Electronic Data Systems has implemented a wide range of systems integration contracts, including the following:

- Designing and implementing the Project 80x personnel management system for the U.S. Army
- Implementing and operating a companywide processing capacity for Enron Corporation
- Working closely with Bank One to design and modernize the commercial banking systems in use in all the bank's operations

EDS is an extremely capable systems integrator. It will continue to use SI as an important ingredient for acquiring long-term systems operations contracts. With its new organizational structure, it will be more focused at vertical industries and will provide industry-specific solutions for its clients.

2. Andersen Consulting

Andersen Consulting is a large multiservice vendor with roots in the professional services business, now operating effectively in the systems integration market.

Andersen Consulting provides services in system design, systems integration, productivity consulting, strategic information planning, change management, systems operations, and network management. The firm also offers application software products that support manufacturing resource planning and control, as well as management and control for the distribution/warehouse market. Andersen also has developed and supported the FOUNDATION computer-aided software engineering (CASE) software product.

Andersen Consulting's revenue for the fiscal year ending August, 1989 was $1.4 billion. Of the total revenue, 30% can be attributed to pure professional services contracts, 65% from systems integration, and 5% to application and systems software products.

In the 1986-1988 time period, a number of senior consulting partners approached Duane Kulberg, Arthur Andersen's former CEO, to lobby for a change in the structure away from the traditional "partnership" structure with practice office accountability. It was argued that this structure was inappropriate to a business with an increasing national and international focus.

As a result, Andersen Consulting was formed in October, 1988, when Arthur Andersen and Co. renamed its Management Information Consulting practice to create a clear, separate identity for the firm's consulting services.

Andersen Consulting's strong set of capabilities in the high end of the life cycle serves to significantly reduce its dependencies on outside suppliers for the high-risk elements of most SI contracts. Its strengths in software development, project management, and packaged systems and applications software have contributed measurably to the firm's success. The firm's more limited experience in service and repair and, to some degree, design integration are not critical to success in the business, particularly in the vertical markets where Andersen Consulting has focused.

Andersen Consulting's alliances and applications software offerings also add significantly to its overall capabilities. MAC-PAC (Integrated Manufacturing) and DCS Logistics (Distribution Control System) are good examples of the latter. And the FOUNDATION development and implementation methodology is probably the best-known package of its type in the industry.

Finally, Andersen Consulting has always placed heavy emphasis on training. Utilizing its internal training and development capabilities, Andersen Consulting has adopted a strategy of consistent development of its staff. Therefore, its professional personnel understand the processes used in acquiring and executing the business. The resulting consistency facilitates the effective deployment of personnel in SI efforts and is a great asset. Andersen states that it will spend approximately $7,600 on each consulting professional for internal training in fiscal year 1990—a total cost of $137 million.

Andersen Consulting's systems integration activities have included the following projects:

- A computer-aided layout and fabrication system for Lockheed. The project lasted 10 months, cost $3.0 million and was completed in October 1987.

- An order entry and inventory control system designed and implemented for Ashland Oil. The project was completed in 1989 at a cost of $5.5 million.

- A cost recovery system developed for the California Department of Developmental Services. This project lasted 17 months and cost approximately $3.6 million.

Andersen Consulting has an excellent overall image as a systems integrator. Strengths include its ability to manage the client's planning process, the resources to handle very large projects, and its focus on professional services. Its ongoing investments in key applications software products, and the continued development and education of its professional staff, will continue to build the positive momentum it has in the marketplace.

Not to be overlooked on the positive side is Andersen's ability to formulate client requirements. Focusing on the high end of the life cycle, Andersen frequently "writes" the RFP, so to speak—a position that many of its competitors should envy. The result is a very high success rate in winning contracts, which minimizes marketing and bid preparation costs.

3. Computer Sciences Corporation (CSC)

CSC provides a broad range of technical services to a broad client base in both the government and commercial systems integration sectors.

CSC has been very successful with its federal systems and services and professional services businesses, where it has provided requirements analysis, software development, systems engineering and integration, and communications and facilities management, primarily to the U.S. federal government.

- The company has historically had a very high success rate, winning over 60% of bids. It also has a strong base of multiyear mega-contracts, generally contracts with a total value in excess of $100 million, which fuel the company's traditionally strong growth rates.

- CSC reports that in fiscal 1989 it won eight such awards, with total contract values in excess of $1.7 billion, in addition to scores of smaller contracts. In fiscal 1990, it did not have its customary success in winning these large "mega-contracts."

CSC had not played a major role in the commercial market before 1987, when it announced a goal of attaining 50% of its profits from commercial business by 1992, based on increasing its commercial revenues to 40% of the total. The company also announced at that time that it had $200 million to spend on acquisitions to augment its existing commercial business. It has made several significant acquisitions to implement this strategy, including Computer Partners, Index Group, CIG-Intersys, Cleveland Consulting and others.

In January 1989, it sold a majority interest in Infonet, its worldwide public network subsidiary, to a group of European and Pacific Rim telecommunications administrations to strengthen Infonet's position as an international communications service. In 1990, it sold its remaining Infonet interest to MCI.

The broadbased services available from Computer Sciences Corporation (CSC) range from management consulting in the strategic use of information and information technology to the development and operation of complete information systems. CSC is a leader in software development and system integration, providing the design, integration, installation and operation of both computer-based systems and communications systems.

CSC's revenues for the fiscal year ending March 1990 were approximately $1.5 billion and represent a 15% increase over 1989. CSC had an extremely successful fiscal 1990, with revenues growing 15% (22% from continuing operations) and net earnings 15%. Its federal revenues grew significantly (11%), despite a fiscally constrained federal market. The nonfederal segments of CSC's revenues grew from 29% to 34% of total revenues. CSC's market segmentation is as follows:

- 66% federal government
- 21% commercial
- 3% state and local
- 10% international

CSC is well-represented in government agencies, as evidenced by the following projects:

- NASA recently selected CSC to manage the science support center for the Gamma Ray Observatory to be launched in 1991.

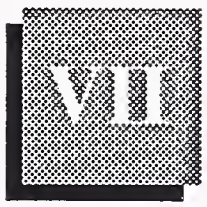
- CSC has been a participant in the planning and preparations for the recently launched Hubble Space Telescope, with responsibilities for software for guidance, experiment control, scientific data analysis and communication links.

- CSC is also a major subcontractor in FTS-2000, supplying the complex billing system for the communications system which will provide voice, data and video services to all federal agencies.

- Teamed with IBM, CSC is providing software for the FAA's Advanced Automation System, a major, long-term modernization of the nation's air traffic control system.

CSC is a leading provider of information technology services to the federal government. The company believes that the federal government is where major new technologies will be developed and applied; where large integrated network operations will be developed; and where technical innovation will continue to be required in order to accomplish changes of the magnitude anticipated in the government sector.

Systems Operations Market Analysis



Systems Operations Market Analysis

A Systems Operations Market, 1989

Third-party operations of computer/communications activities will be a major trend in the 1990s. It may be revolutionary rather than evolutionary, as companies turn their information systems development and/or operations over to service companies.

Systems operations (SO) is the operation of all or a significant part of a customer's information systems function under a long-term contract of not less than one year. There are two submodes of delivery:

- Processing Services: the vendor owns and operates the main computer facility used in the contract.

- Professional Services: the customer owns the main computer facility used in the contract. The vendor provides the staff and expertise to operate the systems.

In examining the details of the market, there are some major changes in structure that become apparent. Traditionally, facilities management was based on customer-owned computers at the customer's site or vendor-owned computers at the vendor's site. Now there are SO opportunities that cross these boundaries with vendor-owned computers at the customer's site and customer-owned computers at the vendor's site.

A further market discriminator is sharing of computers: in customer-owned systems, the computers are usually dedicated to the customer's functions; in vendor-owned systems, the computers are usually shared with other customers. Again, there is some breakdown of these traditional differences.

There are different buyer motivations for approaching a systems operations contract:

1. Platform systems operations contracts result primarily from buyers' attempts to reduce costs or change operational structures, such as in the case of corporate restructuring.

2. Applications systems operations contracts typically result from medium-sized organizations having a need to completely upgrade their information systems in terms of application software and operations. The new approach of partnering between a platform vendor and an application/industry specialist opens up the application systems operation market to a new set of competitors.

Exhibit VII-1 shows this market reached $6.1 billion in 1989. Exhibit VII-2 shows INPUT's preliminary forecast for systems operations, with an 18% CAGR through 1995. User company experience over the next 12 to 18 months, particularly on some of the large, well-publicized contracts, may result in revolutionary growth that significantly exceeds the rate projected.

EXHIBIT VII-1

Systems Operations Market
1989

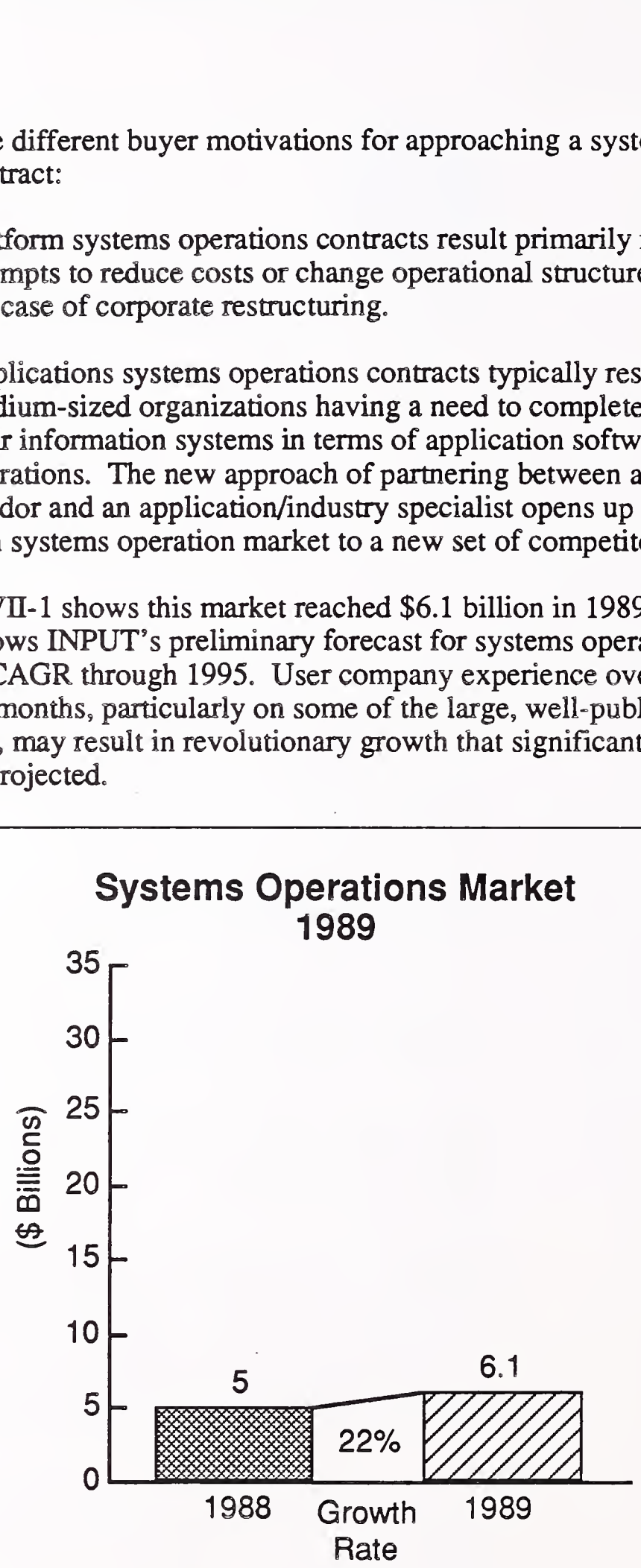
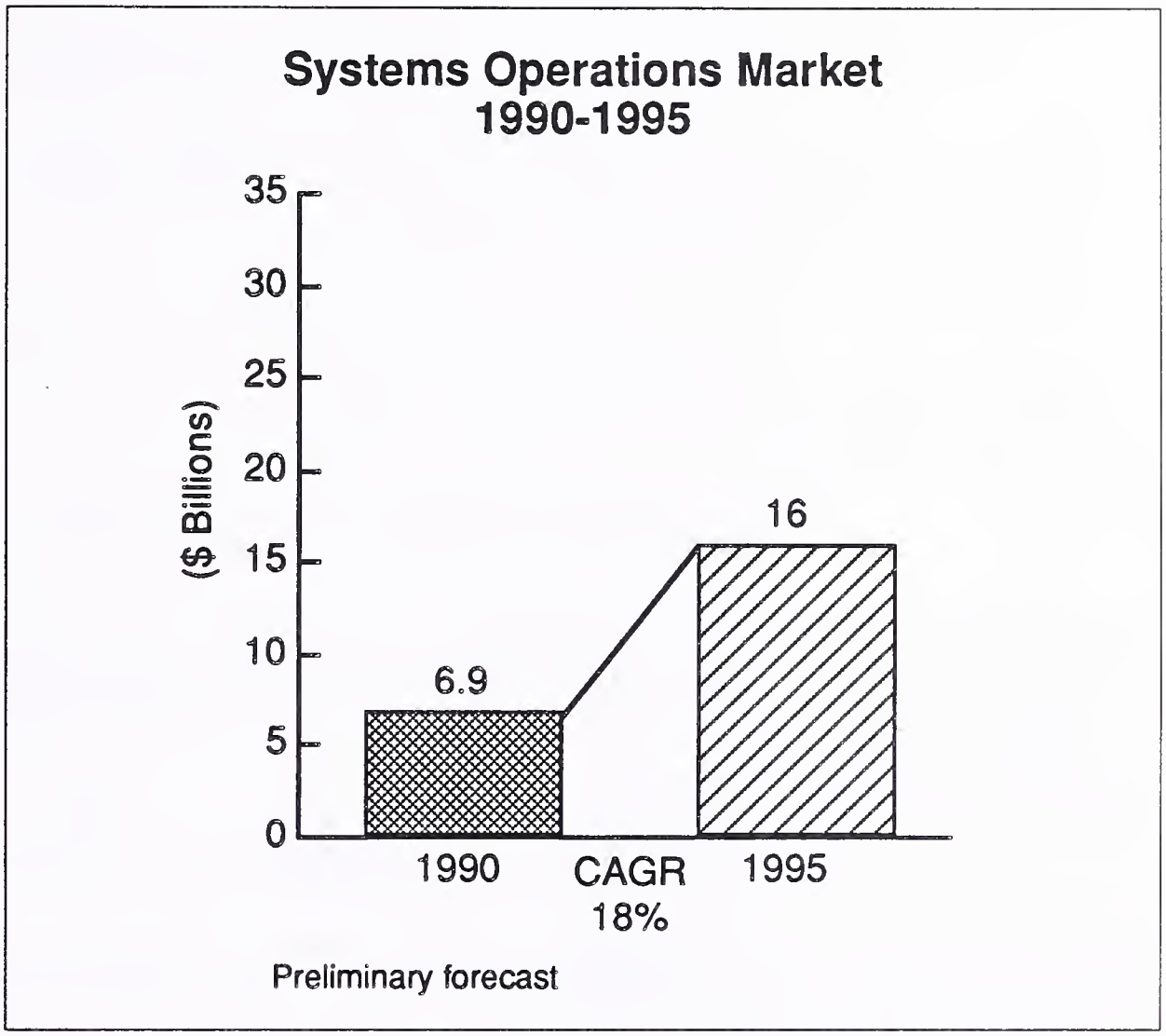


EXHIBIT VII-2



B

Systems Operations Market Trends and Issues

The market factors shown in Exhibit VII-3 drive the growth of the systems operations (SO) market.

EXHIBIT VII-3

Systems Operations Market Driving Forces

- Need to focus on core business
- Desire for improved service levels
- Lack of skilled operating personnel
- Sharing of operating and upgrade costs
- Systems integration projects creating systems operations opportunities
- Concerns about disaster backup and recovery

Executives are looking to information systems (IS) organizations to develop solutions that make a difference in the competitive positions of their business. Competitive advantage comes from the application of the computer/communications operation through applications software to the service activities. A competitive disadvantage results from improperly operated computer operations.

Executives seek outside vendors who can provide satisfactory service levels at reasonable prices, so as to free their internal resources and investment capital for strategic development activities.

The systems operations market is also being driven by the lack of, and competition for, qualified in-house personnel. User management is looking to the information services industry to develop approaches and techniques to improve service levels and increase personnel efficiency in today's data centers. Customers are also concerned about the high costs of upgrading installed systems, both computer equipment and software, and see systems operations as a method for sharing these costs.

As systems integration contracts are completed, some of them will be operated for a short or long term by the contractor. Complex systems cannot easily be turned over to in-house organizations for operation and maintenance. In addition, once a customer is comfortable with contracting system development, contracting systems operations will become a more viable option.

On the other hand, there are factors that will hinder growth in the market, as shown in Exhibit VII-4.

EXHIBIT VII-4

Systems Operations Market
Growth Inhibitors

- Existing in-house attitudes
- Data security and privacy
- Mission-critical applications
- Lack of fallback position in case of failure

The attitudes of the internal personnel in a corporation can be a two-edged sword.

- Senior management personnel, as mentioned earlier, want to free their internal resources to concentrate on the core business their organizations were originally created for. They want the technology upgrade decisions and the staff acquisition issues to be dealt with by experts.

- The middle management levels are more interested in preserving the infrastructure that exists. The natural resistance to change inherent in organizations takes effect and issues such as lack of knowledge of internal procedures, loss of control over critical functions, concerns for security of the data or for privacy of files are raised.

There is a certain subset of major applications in a company which has been designated "mission-critical" to the continued success of the organization. Both government and commercial entities have such functions designated by name or by common internal understanding. An airline reservation system must be on-line at all times. There exists a fundamental difference in attitude toward these functions between government and commercial organizations.

- Among government executives, the objective is often to contract out the entire system operation, vesting operational responsibility for the entire task with the processing contractor. For example, NASA has turned over the operations of the communications network linking all its centers to a contractor.

- In commercial organizations, there generally is much more reluctance to turn over the entire processing and development organization to the contractor. INPUT believes that government managers may be feeling the skill pool depletions more acutely than their counterparts in industry.

Perhaps the major objection encountered is the need to have a fallback position should the system conversion and outsourcing fail to work properly. When management envisions the day when they may have no data processing activity in-house and all systems are being operated by a third party, they often feel they have written off any way to recover if systems operations fails.

There will be renewed interest in systems operations in the 1990s—it will become one of the hottest information services markets. Users that have employed a systems integrator to develop and implement a system solution will become more comfortable with outsourcing, and will look to systems operations as a viable and economical alternative. Systems operations will become a convenient way to free the in-house staff from operational activities and permit it to focus on developing solutions that will make the organization more competitive and profitable.

Systems operations will be an important information service offering in the 1990s. Vendors should position their organizations to participate in its growth and profits.

C

Leading Systems Operations Vendors

Exhibit VII-5 identifies the major systems operations firms in the United States. The following profiles describe the characteristics of each of three successful systems operations vendors and identify their market strategies. Two vendors operate in the commercial market sector and one in the government sector.

EXHIBIT VII-5

Leading Systems Operations Vendors

- Andersen Consulting
- Automated Data Processing
- BDM
- Citicorp
- EDS
- Boeing Computer Services
- Computer Sciences
- Genix
- IBM
- McDonnell Douglas
- Perot Systems
- Power Computing
- Shared Medical Systems
- SIA
- SEI
- Systematics
- Systems Computing Technology
- Unisys

1. Systematics

Systematics provides services to a single vertical market. It is vertically integrated to the extent that it provides front-end business consulting, a comprehensive set of industry-oriented software products, and systems operations.

The company, founded in 1968 and with its headquarters in Little Rock, Arkansas, derives 100% of its annual revenues from the banking and finance industry. Approximately 76% of its revenues are derived from systems operations, 11% from application software products, 4% from consulting services, and the remaining 9% from equipment sales and leases.
Systematics has developed a full set of integrated banking and financial applications called Systematic Integrated Financial Software. This software is available to systems operations clients and also is available to other interested clients as a separate product offering.

The company provides two forms of delivery of systems operations services to clients. For its larger clients, it locates and operates a data center in or near the bank or institution. There are over 60 of these data centers owned by Systematics. Contracts for these large clients are usually five years in length and include a 99-year non-exclusive license for the Systematics-developed software.

Remote processing operations are provided as a option for smaller banks from three company-owned data centers. These services are generally less customized than those provided to the larger clients and are also offered under a five-year contract. The smaller banks can also purchase a non-exclusive contract to continue to use Systematics software following the original remote processing contract.

2. Systems and Computer Technology Corporation (SCT)

SCT is a professional services-based firm that provides systems operations services to a narrow, vertical market.

Founded in 1968 and located in Malvern, Pennsylvania, SCT had an estimated $44.5 million in revenue for fiscal 1989. Approximately 65% of this revenue is derived from systems operations activities, and 500 of its 700 employees are in that segment of the company operations. Approximately 84% of the company's fiscal 1989 revenues were derived from professional services, 12% from application software, and 4% from other sources.

All of SCT's products and services are developed and marketed to state and local governments and educational institutions. It is organized into two operating divisions to service these industries: the Information Resource Management Division and the Software and Technology Services Division.

SCT's Information Resources Management Division focuses primarily on the systems operations market. It provides packaged software and telecommunications planning and implementation services. Its software products are focused on automating administrative functions in education and government institutions. Packages have been developed to operate in a variety of vendor environments, including DEC VAX and IBM mainframes.

SCT was originally established to provide transition management and assistance for public sector organizations that were moving to a new systems environment. Its services included initial operations of the client's new systems, and ultimately, longer-term facilities management contracts.

Today, SCT provides complete systems operations services for its clients. It provides planning, management, staffing, and operating capabilities to satisfy client information needs: the data processing center, management information systems, office automation systems, and telecommunications. SCT personnel are located on the client premises to provide any or all of these functions.

Responsibilities include data center operations, administrative systems development, budget control, long-term planning, user support and liaison, training, hardware procurement, data center design, and integrated communications design and implementation.

3. Boeing Computer Services (BCS)

Boeing Computer Services is an aerospace company that provides systems operations services to a broad range of government agencies

A division of the Boeing Company, the world's leading manufacturer of commercial aircraft, BCS supplies computing and communications resources to all Boeing operating divisions, and to more than 1,500 government and commercial customers worldwide.

BCS was established in May of 1970 to consolidate 13 separate computing organizations within Boeing. The division began with about $250 million worth of computing equipment and a staff of 2,700. Today BCS employs more than 12,000 people located throughout the U.S. and other countries, and manages approximately $1.4 billion worth of company-owned computing and telecommunications equipment.

BCS is currently divided into two major groups:

- Information Services provides services to both government and commercial clients, with approximately 85% of its business in the government sector. Its services include network integration and management products and services, document and image management products, remote computing services (including supercomputing), systems operations services, and education and training services.

- Boeing Support Group (BSG) supplies over $1.1 billion in services to the Boeing Company and its operating divisions. The Boeing Advanced Technology Center, which has been a pioneer in both artificial intelligence applications and in supercomputer systems, is also managed by BSG.

Boeing has had extensive experience managing major systems for government agencies over the last ten years. Major contracts include:

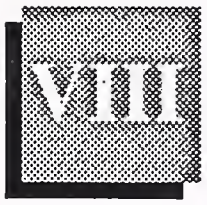
- Implementation and management of a $38 million supercomputer center and network for the State of Alabama. In its first year of operation it achieved an 80% usage rate, with most users coming from business and academia.

- Implementation and management of NASA's Technical and Management Information System for the Space Station program. This contract includes the design and development of an evolutionary engineering data base system that will connect all NASA centers and contractors as the space station is developed and implemented.

- Design, installation, and operation of a nationwide telecommunications network connecting all NASA research centers. The network provides voice, data, facsimile, and video capabilities.

- Operation of the processing facilities for the Department of Energy's Nuclear Processing and Management Facility in Richland, Washington. Boeing has managed this facility as prime contractor, then as subcontractor to Westinghouse for more than ten years.

Software Products Market Analysis



Software Products Market Analysis

A Software Products Market, 1989

The software products market consists of two major categories: systems software and applications software products, defined as follows:

- Systems software products include systems control, data center management and applications development (including data base management system) tools.
- Applications software products include industry-specific (e.g., banking, manufacturing, insurance, etc.) and cross-industry (accounting, human resources, planning and analysis, etc.) software products.

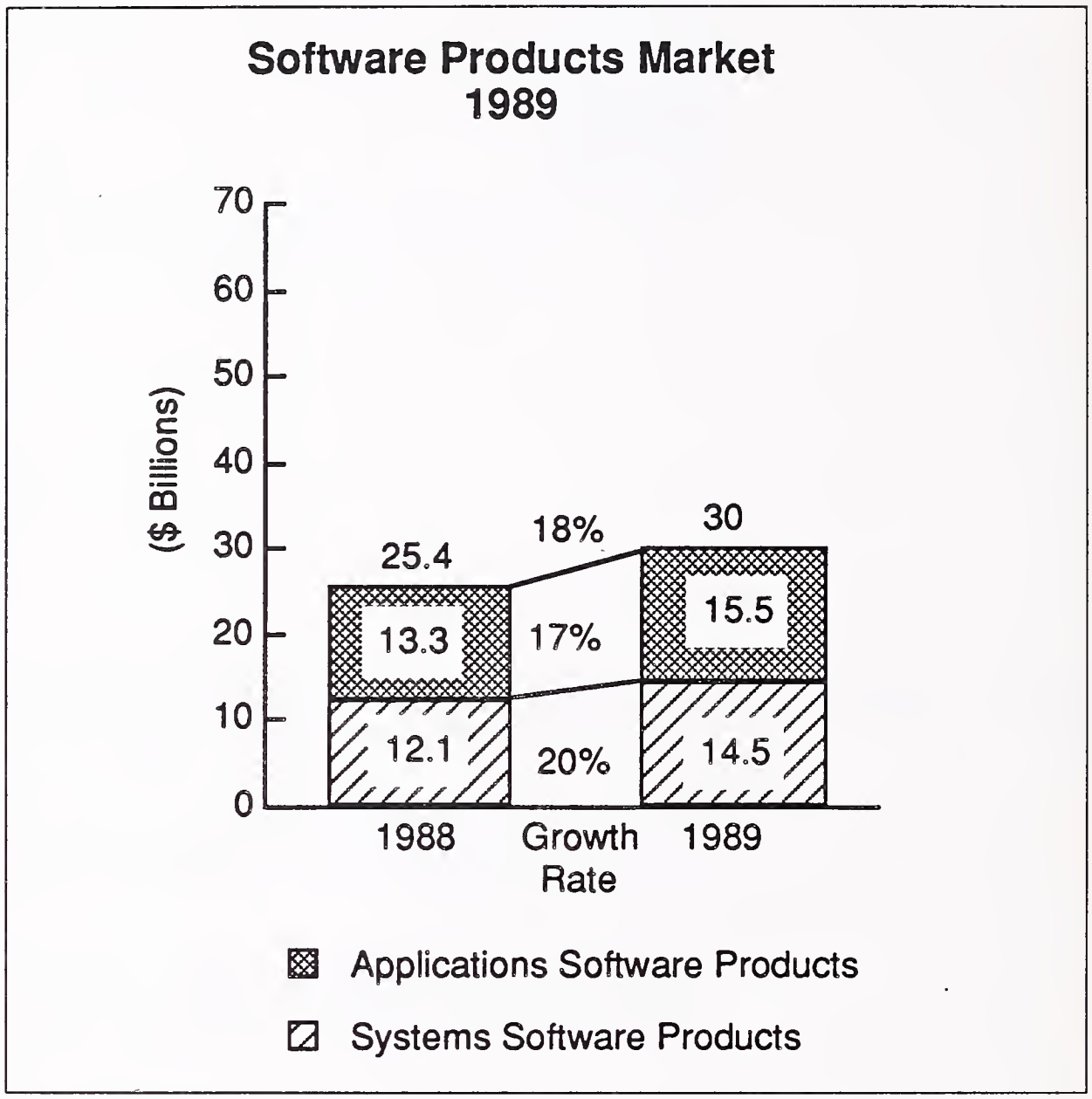
Together these segments represent just over a $30 billion dollar market or about one-third of the entire information systems and services industry in the U.S., as shown in Exhibit VIII-1.

- The two main categories each represent approximately half of the software products market.
- In 1989, the systems software products segment grew more quickly at approximately 20%.

Exhibit VIII-2 shows INPUT's current forecast for the five-year period for software products. The total software products market is projected to experience a compound annual growth rate of 15% over this period, growing to $68.5 billion by 1995.

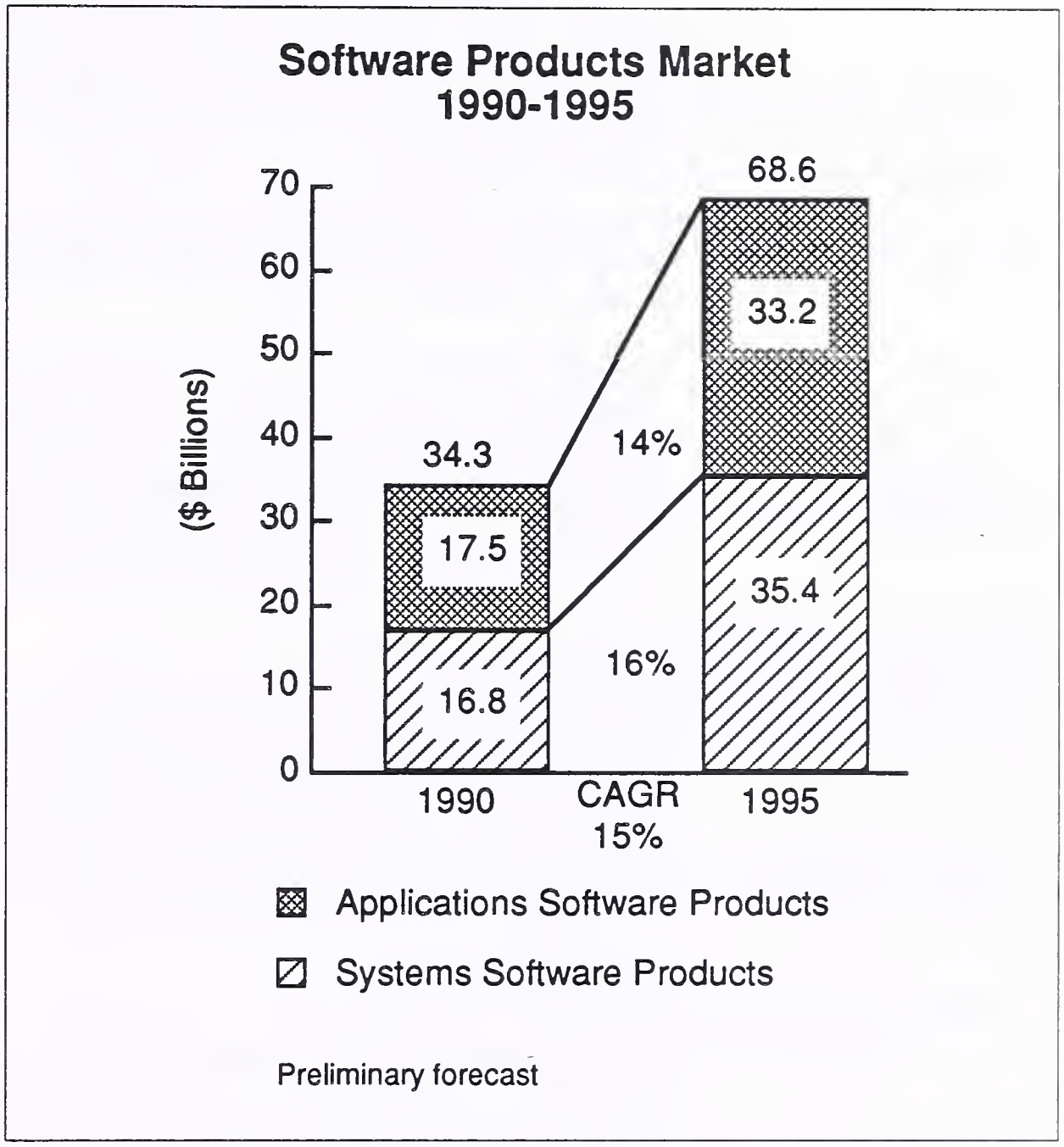
- Over the next few years, growth of the systems software products sector will exceed that for applications software products.
- By 1992 the systems software products market is expected to exceed applications software products in market size.

EXHIBIT VIII-1



The factors affecting the direction of each category are discussed later in this chapter.

EXHIBIT VIII-2



1. Key Trends

Four key trends impacted software products in 1989, and continue to be important in 1990.

a. Consolidation

The software products market continued to experience consolidation in 1989 and early 1990.

- The acquisition of Cullinet by Computer Associates, the formation of D&B Software Services with the merger of McCormack & Dodge and Management Science America and the planned expansion through acquisition of the recently formed Legent are but three examples of continued consolidation in the mainframe segment of the market.

- In the midrange, Ross Systems has broadened its growth through alliances with technology companies such as Ingres for RDBMS technology, and direct expansion through acquisitions of Cardinal Data and Argonaut Information Systems. The stated goal is major growth through acquisition.

- The merger of Ask Computer Systems and Ingres is a major example of what is becoming required to grow or even survive in the software products market of the 1990s.

- The personal computer sector is of course not to be outdone. Product acquisition has been a mainstay of this market with some indications of major acquisition/merger activity on the horizon. Ashton-Tate acquired a majority of Interbase Software Corporation, Lotus and Novell had a recent short engagement period, and mainframe software vendors are open to opportunities to expand at the workstation level.

b. Minority Investment

- The expansion of minority investments in emerging and established software companies continued in 1990. IBM has made numerous investments to support SAA and the CASE arenas as well as other strategic areas. Digital Equipment, Hewlett-Packard, EDS and others seem to be following a similar strategy. The trend is expected to continue.

c. Customer Support

- As the software products companies become larger, with broader product lines, and product use by the end user has expanded, the requirements for customer support have grown. The corporate information systems organization is using customer support as a decision factor in the selection process to a greater degree than a few years ago.

- The response by software products firms to date has been a combination of customer support-related marketing and a growing movement to charge for support above a certain level. The support levels expected from the personal computer software producers are setting the stage for new pay-as-you use programs.

- Software companies are also expanding their professional services organizations. Led by the strategy of Oracle to provide professional services and perform systems integration, others are pursuing these services areas to increase client support and add to revenue.

d. Technology

- Technology trends are also a major factor in software products as the 1990s begin. Open systems, steady strong growth for UNIX, image processing, data center automation and more are all driving new software products. And perhaps the greatest technology force of all, the drive to integrate, is pushing software growth in the systems software sector to higher levels.

2. Leading Software Products Vendors

- Exhibit VIII-3 lists the leading vendors of systems and applications software. They are further categorized as hardware manufacturers, information services vendors and software producers, and applications and systems software products vendors.

  - The growing tendency for professional and processing services firms to become significant software producers supports the changing focus of the industry in general. To be in the solutions business you have to offer software and if it is your own, you have differentiation from the competition and greater margins.

  - All of the software producers had 1990 total (worldwide) revenues exceeding $100 million. Not many years ago, a $100 million software company was relatively unique.

  - Informix is the only primarily UNIX vendor on this list of leaders. That can be expected to change in the next couple of years.

EXHIBIT VIII-3

Leading Software Products Vendors

Vendor	Systems Software	Application Software
• Hardware Manufacturers		
- Bull	X	X
- DEC	X	X
- Hewlett-Packard	X	X
- IBM	X	X
- NCR	X	X
- Unisys	X	X
- Wang Laboratories	X	X
• Computer Services		
- Anderson Consulting	X	X
- Boeing Computer Services		X
- Electronic Data Systems	X	X
- McDonnell Douglas SI	X	X
- Systematics		X
• Software Products		
- Ashton-Tate	X	
- ASK Computer Systems		X
- Autodesk		X
- Borland	X	X
- Candle	X	
- Cincom Systems	X	X
- Claris (Apple)	X	X
- Cognos	X	
- Computer Associates	X	X
- Compuware	X	
- Control Data	X	X
- D & B Software		X
- Equifax		X
- Information Builders	X	
- Ingres	X	
- Informix	X	X
- Legent	X	
- Lotus Development Corp		X
- Microsoft	X	X
- Novell	X	
- Oracle	X	X
- Pansophic	X	X
- SAS Institute	X	
- Software AG	X	
- Software Publishing		X
- Sterling Software	X	X
- WordPerfect		X

B

Systems Software Products

1. Systems Software Market Trends and Issues

The systems software products sector includes applications development tools (e.g., CASE and 4GL), data center management tools and systems control products (e.g., operating systems software).

Exhibit VIII-4 lists the key forces that are driving the market forward and supporting growth.

EXHIBIT VIII-4

Systems Software Products Market Driving Forces

- New technologies
- Data center automation
- Network integration
- Relational/distributed DBMSs
- Graphical user interfaces (GUI)

- New technology remains the leading factor in sustaining software market growth. Image processing, voice processing, cooperative processing and use of LANs are all creating new software product requirements.

  - The shift to the workstation is now well beyond the engineering area. LANs are becoming very common in the traditional business application areas and their integration into the main information network is an objective of essentially all corporate information programs. The result is the beginning of a transition of applications out from the mainframe and beyond the midrange to the workstation level. The opportunity is to provide cooperative processing environments and supporting application development tools.

  - Image processing is becoming an established technology, has fostered the establishment of a number of new companies and has become an area of emphasis for many leading professional services firms. The involvement of the latter in the image market is speeding its growth.

- On the horizon are untapped systems software technologies such as object-oriented software, voice, and multimedia.

- Data center automation and network integration efforts have created new systems software product opportunities for numerous companies.

  - This area has become the primary focus of a number of fast-growth companies such as Systems Center, Goal Systems International and Legent. Through acquisition and new development, these companies are building broad product lines and sustaining significant growth.

  - These software products tend to be high-cost and mainframe-based, and only become affordable when a data center automation and consolidation effort is undertaken.

- Adoption of an SQL-based RDBMS has become a very common element of most information systems programs. The market has been reasonably penetrated at the mainframe and midrange levels, but the battle is on at the LAN and workstation levels. The opportunity is large and will extend well into the 1990s.

  - Microsoft's growing emphasis on its LAN server product exemplifies the importance and the size of the opportunity.

  - Certainly more relational DBMS product has been sold than that which has been implemented. The market can be expected to become well-penetrated during the next five years and growth to slow, as efforts shift to application development and implementation.

- The personal computer, through Macintosh and Microsoft Windows technology, has begun to change the human-computer interface. Menus and command languages are quickly becoming artifacts of the 1980s. The pressure from the user for yet another improvement in ease of use through graphical user interfaces will justify further software purchases both in systems and application software products.

The systems software market is not without growth inhibitors. As listed in Exhibit VIII-5, there are risks for this market sector.

EXHIBIT VIII-5

Systems Software Products Market Growth Inhibitors

- Saturation at all levels
- Outsourcing
- Standards/open systems
- Bundled data base management systems
- Competitive price pressures
- Vendor consolidation
- Multiple platform support

- Saturation at the mainframe level is a well-recognized fact, and now there is a growing recognition that saturation may be developing at the midrange and even workstation levels. Technology continues to drive capability faster than it can be used. With modest growth in processor population, opportunities become tied to penetration levels and uniqueness of product.

  - With growth in the use of systems operations vendors to provide central processing capabilities and the move towards data center consolidation, some further reduction in mainframe population growth is likely.

  - The focus for the next few years will shift to the LAN/server area, where the price per product is much lower.

  - Saturation leads to a replacement versus new market. Justification of a replacement expense is different than for the original investment.

- The success of EDS, Systematics and others in moving companies to their large multicustomer processing centers begins to limit opportunities for very high-end data center products, as it removes the customer's data center from the potential customer list.

- The impact of standards, whether proprietary (e.g., SAA) or industry-based (e.g., SQL), continues to grow. In the latter half of the next five years, the propagation and adoption of standards may begin to negatively impact the value of software products as many capabilities become commodities.

  - Open Systems is becoming the underlying strategy of a number of hardware manufacturers (e.g., Hewlett-Packard, Unisys, Data General) and is of growing interest to the information systems function as they attack the network integration objective. The standards are not all in place and are slow to be developed and implemented.

  - The data base management systems market is controlled by a standard, SQL, pushing towards product differentiation to user interface, distributed processing and performance issues.

  - The UNIX market is becoming established outside the engineering and research areas, but remains modest compared to the total market. The year of UNIX still has not arrived.

- At the midrange level and with OS/2, the bundling of the SQL data base management system raises serious competitive issues for DBMS vendors.

- AS/400, OS/2 Extended Edition with Database Manager, and DEC's bundling of Rdb2 (runtime only) with VMS are all efforts by proprietary systems software vendors to control their markets.

- Workstation vendors are including increased amounts of software with the initial purchase, which reduces market size.

- As the number of systems software vendors has grown, and with a significant number of vendors of substantial size (greater than $50 million in annual revenue), price competition is on the rise. In addition, distribution channels are changing as the market shifts from the central mainframe to the workstation.

  - Price competition, tied to growing penetration levels, may begin to affect profitability—as it did in the mainframe DBMS market—and to become another factor in industry consolidation.

  - Purchasing a single copy for multiple users on a LAN environment is more cost-effective than either a midrange environment or PC versions for individual users. The buyer gains, but market size and potential is reduced.

  - Bundling of software turns it into essentially free software. As noted above, this is occurring with renewed frequency as a means of differentiating a computing environment and controlling user direction, but it is being done at a loss of revenue.

- Consolidation—as that achieved by Computer Associates, the creation of Legent or the recent acquisition of NetMaster by Systems Center—is not without disruption. Growth slows, strategies change and the customer and prospect base becomes cautious. INPUT expects consolidation to continue and believes it is necessary, but it does slow the growth rate to some degree in the short term, as the organization assimilates the new products.

- An inherent cost of today's software market is the multiplatform issue faced by RDBMS companies such as Oracle, Ingres, and Sybase. UNIX and open systems strategies provide protection, but the ongoing strength of the DEC and IBM proprietary environments tax development resources. Today's systems software vendor is burdened with the cost of developing for multiple computing environments.

2. Leading Systems Software Vendors

The following brief profiles of systems software products vendors clarify the trends and issues discussed above.

a. Computer Associates International

Computer Associates International (CA) is well recognized as the largest software products company, with major product lines in both systems and applications software and on all three platform levels—mainframe, midrange and workstation/PC. The growth has been fueled by acquisition throughout the 1980s, with ever-larger acquisitions. The three most prominent were UCCEL (1987), Applied Data Research (1988) and Cullinet (1989).

Computer Associates' strategy reinforces a number of the trends impacting the systems software marketplace.

- Consolidation, as just highlighted. CA has both grown through acquisition and suffered, at least in the recent period, because of it. The impacts of the Cullinet acquisition on sales and income growth have been negative in the early part of 1990.

- CA has now responded to the pressure on its mainframe DBMS products (Datacom DB from ADR and IDMS from Cullinet) from the movement to relational DBMS. The recently announced relational version of IDMS is a true step forward and a solid answer. CA appears not to have done what some thought it would and simply serve the IDMS installed base with maintenance. Instead, it has funded and quickly brought to market what is expected to prove to be a solid alternative to DB2, at least for those customers with existing IDMS investments.

- CA is also working to maintain its position in the data center and systems control software area and, more importantly, has announced is software strategy for the 1990s. Called by some an answer to IBM's SAA, it is at minimum a strategy statement which the users of CA's systems software products can use to track CA's commitment to new and enhanced products.

As the independent largest software company CA is working hard to provide a framework for its future in the eyes of its customers.

b. Goal Systems International

Goal Systems International typifies the systems software company that has blossomed through quality development and straightforward marketing of products for the IBM mainframe data center. Though it has been in existence for 15 years, the company's industry position has primarily evolved since about 1985. Sales have grown over 400% in the past five years and now exceed $60 million.

In recent years a key part of Goal's strategy has been to expand through product acquisition. It wants to be a strong force in the data center management market and has been acquiring modest (more recently, larger) independent companies to meet that objective. In most early acquisitions, Goal would maintain the development staff of the acquired operation while integrating the marketing and sales activities into Goal's established structure.

The two latest acquisitions, Essential Software and Tower Systems International, are speeding Goal's growth due to their size, and greatly strengthen its position in the data center area. They will also provide challenges as Goal learns to absorb full organizations; its prior experience has been in absorbing primarily product development companies.

Throughout this period Goal has also carved out a leadership position in the computer-based training market. Contributing about 25% of revenues, the Phoenix CBT system owns the lion's share of the mainframe development market for computer-based training. In addition the underlying technology has spanned a number of related products.

Goal has retained its focus on the IBM mainframe data center market, allowing it to constrain its sales and marketing costs and streamline the sales and support process to assure client satisfaction.

c. Systems Center

The Systems Center strategy parallels that of Goal Systems to a significant degree. Starting life as VM Software, the company developed a family of products to improve the ease of use and performance of IBM's VM operating center. By early 1989, the product line had begun to expand beyond VM to the MVS area and the name was changed to Systems Center.

Since 1988, Systems Center has broadened its business by acquiring products and development personnel from smaller independent firms. Its focus has included products that improve the performance of IBM's DB2 relational data base. It now has an extensive product line and perhaps the largest market share in this market niche.

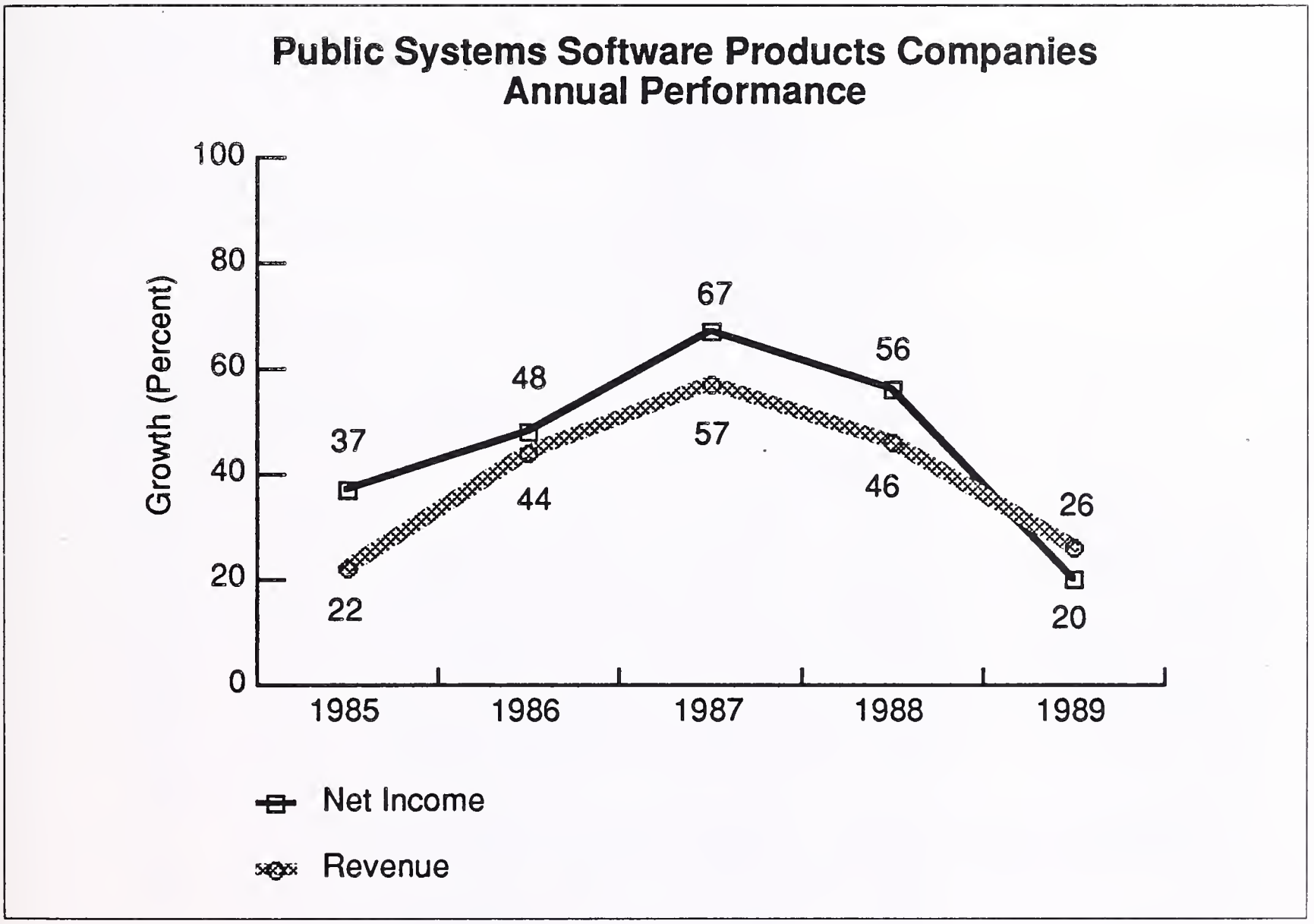
System Center's latest and boldest move is to acquire marketing rights to NetMaster, the leading competitor to IBM's network management product Netview, from Cincom Systems, and to acquire the developer of NetMaster, Software Development International, Pty. This acquisition offers the foundation for Systems Center to become a force in the network integration and network management market, which is expected to be a major growth area in the 1990s.

3. Public Systems Software Company Performance

a. 1989 Performance

As shown in Exhibit VIII-6, growth for public systems software vendors was 26% in 1989, compared to 46% and 57% in 1988 and 1987, respectively. Computer Associates, the largest of the public systems software products vendors, grew 9% during 1989. Computer Associates' results were adversely impacted by the lengthy process of acquiring Cullinet and integrating the Cullinet product line.

EXHIBIT VIII-6



The most substantial growth for the group (95%) came from Oracle, which acquired professional services firm Falcon Systems in September 1988.

Earnings growth for this group of vendors slowed to 20% during 1989. Most of the vendors performed well throughout the year. The exceptions were Ashton-Tate, Cognos, and Ingres. Ashton-Tate's $28.6 million loss for the year, the most significant loss sustained by the group, was attributed to revenue declines resulting from the decision to reduce distribution channel inventories after consumer acceptance of dBASE IV version 1.0 failed to meet Ashton-Tate forecasts.

The profitability situation for this group of vendors for 1989 was 12%, well above the average for the industry.

Exhibit VIII-7 provides 1989 revenue and net income results by company.

Morino Associates and Duquesne Systems merged to form Legent Corporation.

EXHIBIT VIII-7

Public Systems Software Products Companies Revenue and Net Income

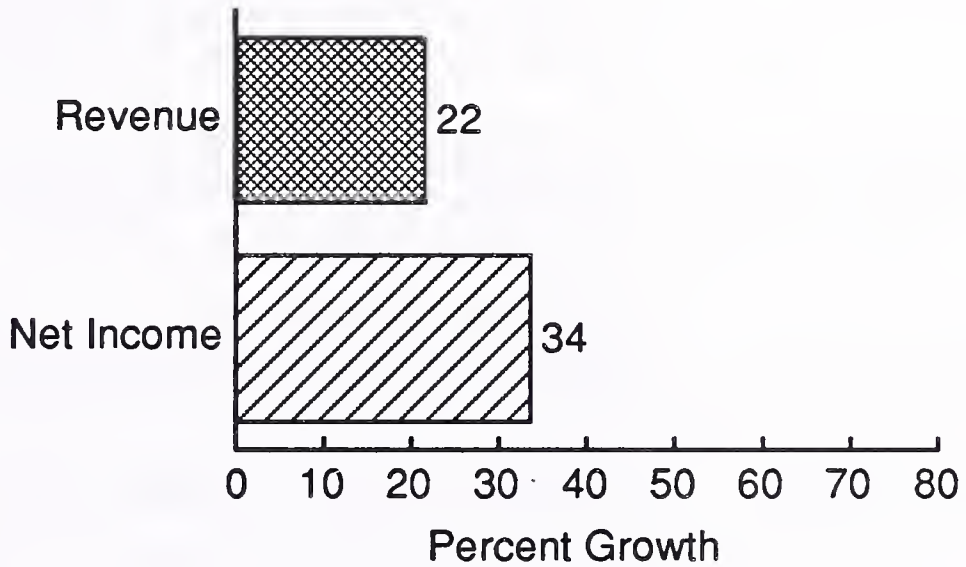
Company Name	Revenue			Net Income		
	1988 ($ Millions)	1989 ($ Millions)	% Change	1988 ($ Millions)	1989 ($ Millions)	% Change
ADOBE SYSTEMS	83.5	121.4	45	21.2	33.7	59
ASHTON-TATE	307.3	265.3 [1]	-14	47.7	-28.6 [2]	-160
BGS SYSTEMS	17.1	20.2	18	2.6	4.0	54
BOOLE & BABBAGE	61.5	78.9	28	3.7	5.4	46
COGNOS	98.8	113.6	15	5.3	-14.9 [3]	-379
COMPUTER ASSOC.	1,133.0 [4]	1,230.2 [4]	9	96.9 [4]	149.3 [4]	54
INFODATA SYS.	12.3	12.0	-3	0.5 [5]	-0.8	-278
INFORMIX S/W	103.5	145.0	40	0.4	6.4	1500
INGRES	108.2	143.4	33	6.4	1.9 [6]	-70
INTELLICORP	20.9	23.4	12	0.4	1.3	225
LEGENT	103.5	134.3	30	20.9	24.0	15
MICROSOFT	718.5	952.8	33	151.4	210.5	39
ON-LINE SOFTWARE	81.2	85.0	5	-2.7	3.3	222
ORACLE	394.8	769.3 [7]	95	56.4	97.7 [7]	73
PANSOPHIC	189.0	232.0 [8]	23	19.3 [9]	19.8	2
SAGE SOFTWARE	20.7	23.9	15	1.9	2.3	21
SYNERCOM TECH.	13.5	16.2	20	-1.6	1.1	171
SYSTEMS CENTER	51.7	66.2	28	7.4	10.6	43
Total	3,519.0	4,433.1	26	438.1	527.0	20

b. The First Six Months of 1990

As shown in Exhibit VIII-8, for the first six months of 1990 revenue growth for this group of vendors was 22% over the same period in 1989. Most vendors performed well during the first half of the year, with the most substantial growth coming from Oracle (59% growth) and Microsoft (55% growth). Revenue declines were reported by Ashton-Tate (42%) and Computer Associates (6%).

EXHIBIT VIII-8

Public Systems Software Products Companies Performance First Six Months of 1990



Earnings growth for this group of vendors was 34% during the first six months of 1990. Microsoft led the group with a 79% increase in earnings over the same period last year. Losses were reported by Ashton-Tate (due to continuing declines in data base revenue, including international sales, pending shipment of dBASE IV version 1.1) and Pansophic (due to one-time charges associated with the discontinuance of its graphics business and the closing of a Brazilian unit).

Profitability for the group reached 11.9% for the first half of 1990, compared to 10.8% for the first half of 1989.

c. Footnotes

1. Ashton-Tate's revenue decline in 1989 resulted primarily from the company's program to substantially reduce distribution channel inventories after consumer acceptance of dBASE IV version 1.0 did not meet Ashton-Tate forecasts.

2. Ashton-Tate's losses for 1989 include write-offs of certain product rights and inventories valued at $11.1 million, principally related to the Decision Resources product line acquired in 1986.

3. Cognos' 1989 losses include $4.7 million in restructuring charges.

4. Computer Associates' results have been restated to reflect the pooling-of-interests acquisition of Cullinet in September 1989.

5. Infodata's 1988 results include a gain on securities transactions of $84,000 and a tax benefit of $156,000 from net operating loss carry-forward.

6. Ingres' 1989 results were attributed to expenses associated with porting INGRES Release 6 to all of the hardware platforms supported, and major marketing expenditures.

7. Oracle's results include the operations of Falcon Systems from the date of its acquisition in November 1988.

8. Pansophic's 1989 results include the operations of the Systems Division of Genigraphics Corporation from the date of its acquisition in May 1989.

9. Pansophic's 1988 results include an after-tax gain of $1.4 million from the sale of nonexclusive Telon 38 marketing rights.

C

Applications Software Products

1. Applications Software Products Market Trends and Issues

The applications software sector includes all industry-specific software products, as well as such cross-industry categories as accounting, office systems, and engineering. Included are personal productivity products such as word processors, spreadsheets and desktop publishing tools.

Exhibit VIII-9 lists the driving forces affecting the opportunities that exist in the applications software products area.

EXHIBIT VIII-9

Applications Software Products Market Driving Forces

- Net technologies
- User involvement in product selection
- Industry-specific focus
- Relational/distributed DBMSs
- Graphical user inderfaces
- Global opportunities

- As with systems software products, new technologies are benefiting the applications software products area.
  - The movement of true processing function to the workstation will result in many applications being re-engineered. The opportunity to buy that application instead of developing it in-house will present itself in a period where buying application software products is much more common.
  - The success of systems software capabilities such as distributed data base technology will permit the creation and purchase of new truly enhanced applications.
- The growing inclination for the buyer to purchase versus develop the application is moving in favor of the software vendor.
  - With users playing a greater role in the application design and selection process, strong opportunities exist for vendors to sell LAN- and workstation-based application packages directly to users.
  - The increased interest in buying, when combined with the ease of development of today's software technology, is making it possible to profitably market application software products to smaller markets where the application requirements are unique.
- One of the underlying factors that has sped the use of relational technology has been the ease with which the user can understand and use the technology. There is now little surprise that RDBMS capability has become a requirement in the application selection process. And as a result, application software companies are scrambling to develop RDBMS-based products to compete in the 1990s marketplace. Oracle launched this trend with its financial application software products.
- The movement to graphical user interfaces, as noted in the systems software section, is a fundamental shift in software technology and capabilities. While adding to development costs, it creates a competitive advantage by providing the opportunity to go back to a customer and sell a new version/product.
- Application software products that deal with the increasingly integrated worldwide markets for larger corporations is a whole new sector for application vendors. Applications addressing customs issues, currency translation and other needs offer product opportunities on an international scale.

Like systems software, the applications software market is not without some growth inhibitors. Listed in Exhibit VIII-10 are factors inhibiting growth in this market.

EXHIBIT VIII-10

Applications Software Products Market Growth Inhibitors

- Mainframe and midrange saturation
- End-user confusion
- Custom development
- Decreasing product life cycles
- Distribution channels
- Competitve price pressures

- The declining growth rate in population for mainframes and midrange computers is restricting the market for traditional application software products.
  - Some of this market is shifting to replacement in support of distributed processing environments or for newer (RDBMS and GUI) technology. The successful vendor must be using the latest application development tools.
  - The movement of application functions to the workstation is lowering the unit cost.
- There are in many instances just too many alternatives for the end user. The result is a delayed decision.
- The growth in the use of professional services and systems integration firms is making it easier to custom-develop applications. The capability exists to develop an application quickly without waiting for the internal information systems function to respond.
- The speed with which underlying technology (e.g., DBMS, GUI, LAN and more) is changing makes for tough choices on what to use for a new application product. Furthermore, the market life of the product becomes shorter. The increased development cost that results may impact development of alternative products.

- The distribution channels for some application software products are shifting at a time when price competition is on the rise. The result is some confusion at the vendor level.
  - As the buyer, rather than the information systems department, becomes the end user, the selection criteria change.
  - The expanding role of professional services and systems integration firms in major application programs can remove selection authority from the final customer and place it in the hands of another vendor.
  - The move to expanded workstation-based products changes the cost of distribution, the pricing of the product and who is the decision maker.
- Many of the price pressures that exist for systems software apply to the applications software product market as well. Lower unit costs for workstation- and LAN-based applications will prove to be a significant factor over the next few years.

2. Leading Applications Software Vendors

The following brief profiles of leading applications software products vendors clarify the trends and issues raised above.

a. Andersen Consulting

Andersen Consulting is an example of what the professional and processing services companies can do in the software market should they choose. It is becoming a strong software player in both the applications and systems software products segments.

- Andersen has sold application software for some time, primarily the MAC-PAC family of manufacturing software first released in 1986.
  - That product line has been broadened to the midrange (AS/400).
  - In 1989, Anderson acquired PIOS from McCormack and Dodge to provide it with a more general purpose manufacturing software product line and one that runs on DEC environments.
- Andersen Consulting also markets customer service and logistics software, DCS/Logistics.
- Andersen's FOUNDATION product line is a fully integrated family of CASE tools that supports the applications development cycle. Developed first for internal use, FOUNDATION is now marketed by a dedicated sales staff.

As Andersen's professional services and systems integration business has expanded, it has learned that there are real opportunities to use its expertise to develop proprietary software products and that there can be substantial financial gain in a successful software business.

b. Consilium

Consilium proves that new application software markets still exist. Founded in 1978, Consilium's real success has come in the past three years. Growth in 1988 and 1989 averaged over 50%, and the company's success has given it the opportunity to begin to expand beyond its original application market niche.

Consilium's market is factory floor management software, an area not addressed by the MRP and MRPII software companies. The Workstream product family is a high-priced integrated set of software that permits lot size type manufacturers to gain true control of the factory floor. In this period of just-in-time and computer-integrated manufacturing, the factory floor is where the leverage is, not the material planning process. Consilium has created a market and at this point dominates it.

The growth rate for this new market will be tied to the ability of Consilium to broaden the appeal of Workstream (new versions are in development for discrete manufacturers) and to the possibility for another company to become a real competitor, pushing the price to a more easily justified level. At this point, Consilium seems to be on its own.

c. Ross Systems

Ross Systems in many ways typifies the challenges facing the traditional applications software products firm. Though smaller than the mainframe companies (e.g., MSA), Ross has found expanding beyond the traditional DEC-based accounting application area a struggle. Under new ownership and management since late 1988, Ross has launched a growth-by-acquisition strategy, and most recently announced answers to the software technology challenges it faces.

- In 1989, Ross acquired Cardinal Data Corporation, adding software for the distribution industry and in early 1990, acquired Argonaut Information Systems, adding a line of human resources application products.

- At the same time, Ross has launched a technology transition for its existing products, the Renaissance Series. The need to provide RDBMS versions, address portability and simply upgrade products to compete with the Oracle financial products has now been addressed.

- Ross is also using marketing alliances to broaden its appeal and to provide greater leverage for its sale and marketing efforts. Alliances with a 4GL developer (SmartStar), an RDBMS developer (Ingres), the leading marketer of executive information systems products (Comshare), plus stronger ties to Digital Equipment are all elements of its efforts to be the largest provider of DEC application products.

Ross's stated goal is to reach the $100 million revenue level in the near term and to become a multiproduct supplier of application software for Digital users. Achieving this will put it in that growing but still exclusive group of large software vendors. However, before it reaches that level, it will also have to address the UNIX issue.

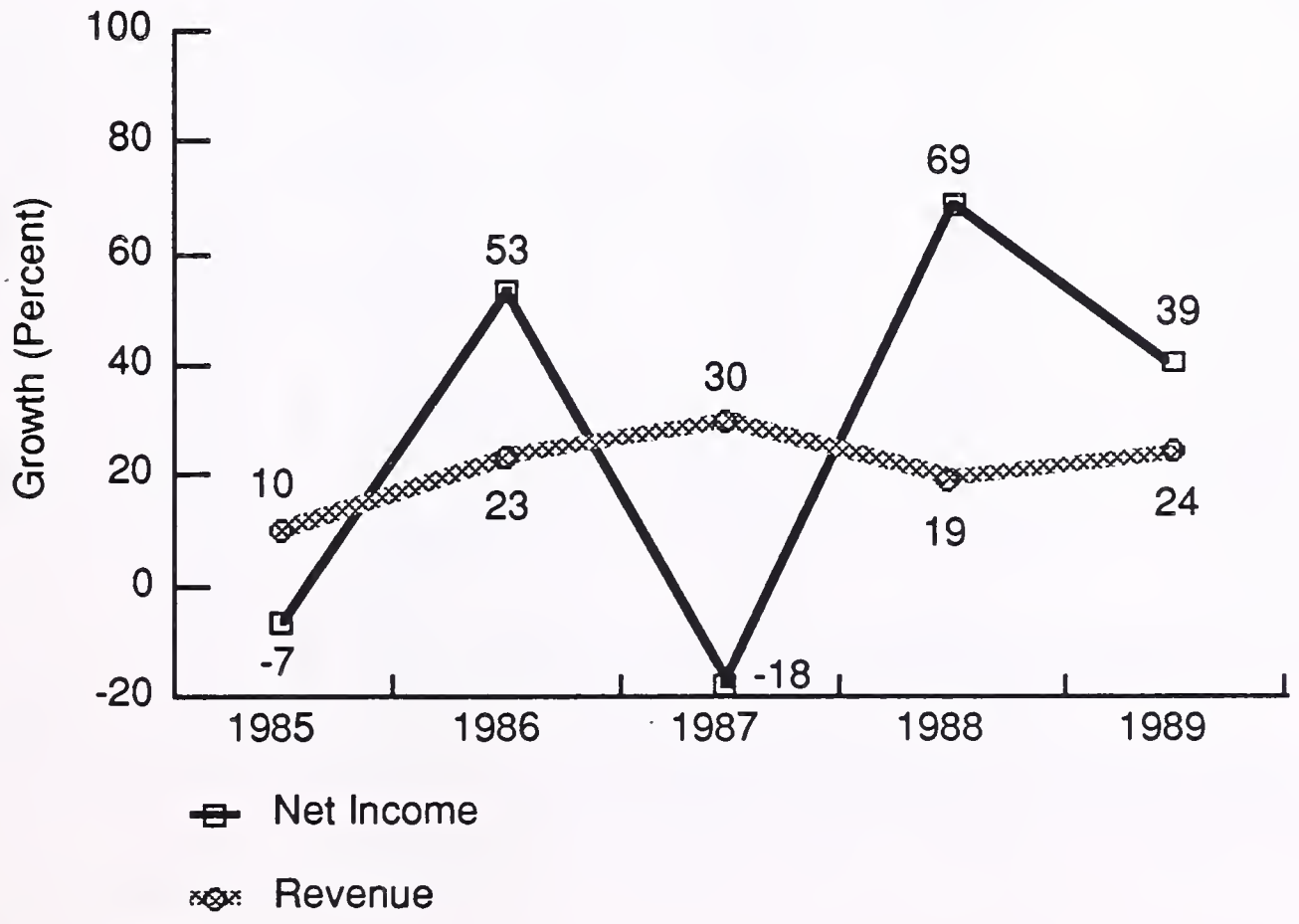
3. Public Applications Software Products Company Performance

a. 1989 Performance

Public applications software products vendors have grown steadily during the past few years. In 1989, revenues for the group grew 24% over the previous year. The most significant growth (82%) was achieved by Cadence Design Systems, which acquired Gateway Design Automation Corporation in a pooling-of-interests transaction in December 1989, and Tangent Systems in March 1989. These two acquisitions added over $32 million to Cadence's 1989 revenue. (See Exhibit VIII-11.)

EXHIBIT VIII-11

Public Applications Software Products Companies Annual Performance



Omitted from the group this year was Management Science America, which was acquired by Dun & Bradstreet during 1989 and merged with McCormack & Dodge.

During the past five years, growth in earnings has fluctuated continuously from quarter to quarter and year to year. In 1989, earnings for the group grew 39%. Results were positively impacted by Cadence (whose earnings increased 75%, due partially to acquisitions), Autodesk (whose earnings increased 42%), and System Software Associates (whose revenue increased 40% during 1989).

Profitability for the applications software products group rose to 13% during 1989.

Exhibit VIII-12 provides 1989 revenue and net income results by company.

EXHIBIT VIII-12

Public Application Software Products Companies

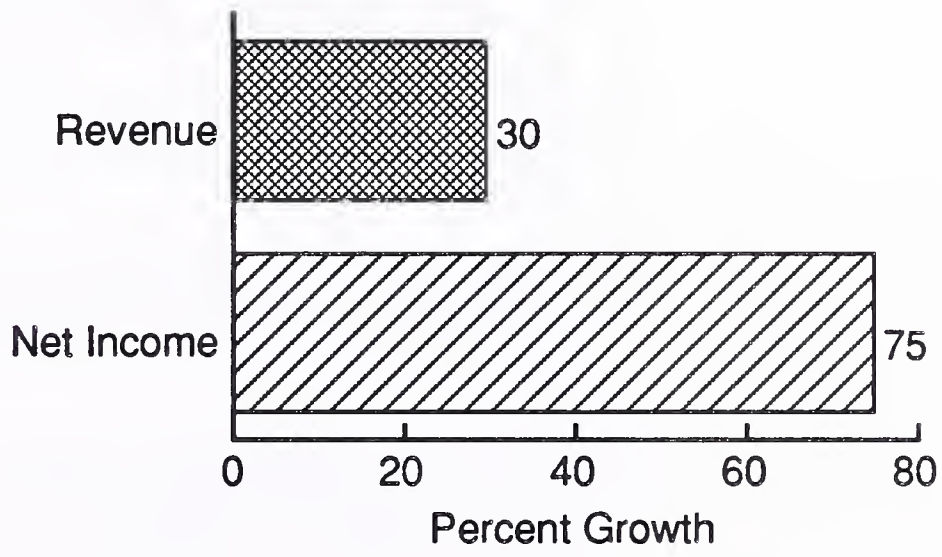
Company Name	1988 ($ Millions)	1989 ($ Millions)	% Change	1988 ($ Millions)	1989 ($ Millions)	% Change
AMERICAN SOFTWARE	64.2	86.3	34	13.8	17.2	25
AUTODESK	117.4	117.3	0	32.6	32.7	0
CADENCE DESIGN	78.6 [1]	142.8 [1]	82	15.9 [1]	27.8 [1]	75
COMSHARE	82.9	94.6	14	3.6	6.3	75
CYBERTEK	20.9	24.0	15	-0.2	1.8	1,000
FDP	14.0	14.7	5	0.9 [2]	-0.1 [3]	-111
GENESEE	1.3	1.7	31	0.1	0.2 [4]	100
HOGAN SYSTEMS	48.1	46.8	-3	-0.3 [5]	3.3	1,389
INFO SCIENCE	13.0 [6]	13.8	6	-0.2 [6]	-0.4	-100
LOTUS DEVELOP	468.6	556.0	19	58.9	68.0 [7]	15
MACNEAL SCHWEND	40.0	45.0 [8]	13	8.9	9.8	10
POUCY MGMT	216.9	265.6	22	20.5	26.8 [8]	31
SCIENTIFIC S/W	23.6	20.9	11	2.2	0.5	123
SILVAR-LISCO	19.3 [9]	13.6	-30	-3.3	-6.1 [10]	
SOFTWARE PUB	82.3	110.4	34	14.8	18.8	27
S/W SVC AMER.	7.4	3.2	-57	0.0	-0.7 [11]	-6,900
STOCKHLDR SYS	20.9	23.6 [12]	13	3.5	3.2 [13]	-9
SYSTEM SOFT	70.6	98.6	40	7.2	12.1	68
TIMBERUNE S/W	9.0	10.7	19	0.4 [14]	0.8	103
WORDSTAR	41.9	41.9	0	-7.7 [15]	-3.3 [16]	57
Total	1,440.9	1,731.5	20%	167.2	218.7	31%

b. The First Six Months of 1990

As shown in Exhibit VIII-13, for the first six months of 1990 revenue growth for this group of companies was 30% over the same period in 1989. The most substantial growth (52%) was achieved by Cadence Design Systems. Significant revenue growth was also reported by Autodesk (38%), Software Publishing (37%), Lotus Development (35%), and Policy Management Systems (31%).

EXHIBIT VIII-13

Public Applications Software Products Companies Performance First Six Months of 1990



Earnings growth for this group of vendors was 75% during the first six months of 1990. Lotus Development led the group with a 197% increase in earnings over the same period last year, with most of the other vendors also reporting increases in earnings.

Profitability for the group reached 11.7% for the first six months of 1990, compared to 9.3% for the same period a year ago.

c. Footnotes

1. Cadence's financials have been restated to reflect the pooling-of-interests acquisition of Gateway Design Automation Corporation in December 1989. Cadence's 1989 revenue also includes the results of Tangent Systems Corporation from the date of its acquisition in March 1989.

2. FDP's 1988 results include a tax credit of $324,000 from the cumulative effect of a change in accounting for income taxes.

3. FDP's 1989 results were attributed to the financial effects of replacing timesharing revenue with revenue from the sale of software and services.

4. Genesee's 1989 results include a net gain of nearly $70,000 from the sale of a building.

5. Hogan's 1988 results include a nonrecurring write-off of $3.6 million associated with the suspension of development efforts on a micro-to-mainframe communications software product.

6. Information Science's 1988 results have been restated to reflect certain changes in the method of accounting for revenue and certain expenditures.

7. Lotus' 1989 results include a pretax gain of $6.8 million from the sale of Lotus Information Network Corporation, a provider of real-time stock market information using FM-sideband technology.

8. Policy Management Systems' 1989 results include the results of Advanced System Applications, Inc. from the date of its acquisition in November 1989.

9. Silvar-Lisco's 1988 results have been restated to reflect a change in the method of accounting for revenue on license fees and maintenance.

10. Silvar-Lisco's 1989 results include a $1.6 million gain from the sale of the majority interest in the company's European development subsidiary, less $4 million in restructuring costs and a $2 million reserve associated with the termination of a research and development contract with Prutech Research and Development Partnership II.

11. Software Services' revenue declines during 1989 were attributed to the company's focus on the development of a new branch automation system.

12. Stockholder Systems' 1989 results include the operations of Fannie Mae Software Systems from the date of its acquisition in June 1989.

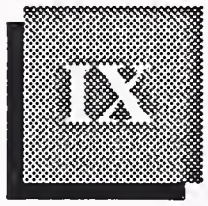
13. Stockholder Systems' 1989 results were attributed to lower than expected product license sales, increased expenses associated with the acquisition, and research and development costs related to a new retail data base system and a mainframe-based loan recovery system.

14. Timberline's 1988 results include a one-time charge to earnings of $235,000 related to the write-off of development costs of a tax preparation software product.

15. WordStar's 1988 results include a one-time charge of $1.8 million relating to a settlement of a securities lawsuit.

16. WordStar's 1989 results include a one-time charge of about $1.1 million for the write-off of an investment in a Macintosh product acquired from Challenger Software.

Turnkey Systems Market Analysis



Turnkey Systems Market Analysis

A Turnkey Systems Market, 1989

INPUT defines a turnkey system as an integration of computer equipment, systems software, and packaged application software into a single system solution developed to meet a specific set of user requirements. The turnkey vendor adds value in terms of software and support services, often providing the application software and customizing services.

Originally tied to vendors such as Intergraph, Triad, Computervision, Interleaf and ASK Computer Systems, some of which provided proprietary hardware as well as application software, the turnkey system market changed during the last half of the 1980s.

- Many turnkey vendors no longer directly handle the equipment, with the system manufacturers (Digital, Hewlet-Packard, etc.) assuming direct responsibility for that portion of the total solution. Vendors such as Interleaf and ASK have changed their strategy to more closely align with that of applications software products companies.

- Some very large turnkey companies remain—Intergraph and Prime Computer, for example—which produce the entire turnkey system, including the equipment and application software.

During this same period another type of turnkey vendor has evolved. The value-added reseller (VAR) vendor has grown out of the vertical industry markets, and with the availability of lower-cost computers such as workstations and larger personal computers, has become a significant channel for multiuser application software products.

- The VAR may serve only as the integrator, acquiring the equipment and software components of the solution from other vendors.

- The VAR adds value by customizing the solution to a customer's needs, performing the installation and providing service.

- The VAR often finds its market opportunities in the specialized needs of vertical industries and smaller businesses.

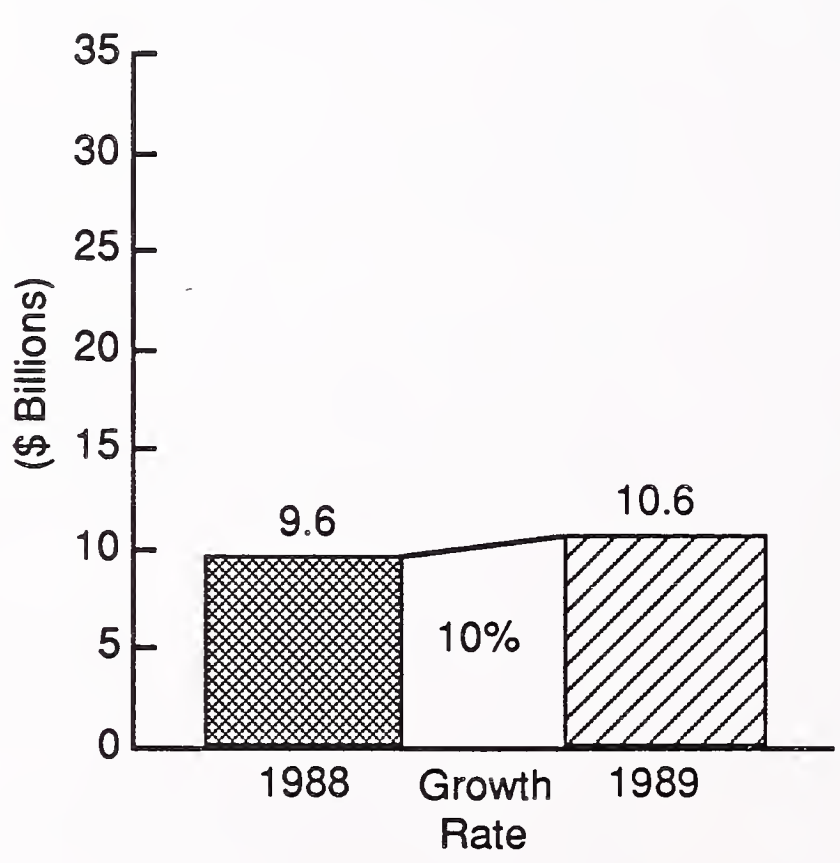
The turnkey systems market consists of a large number of vendors (over 7,000), but with only a modest number (perhaps 150) having annual revenues over $10 million. The vast majority have revenues under $2 million.

The result of these shifts in definition and strategy by turnkey vendors has been a lower rate of growth than that experienced by the other market sectors over the past few years.

As Exhibit IX-1 indicates the turnkey systems market grew by only 10% in 1989.

EXHIBIT IX-1

Turnkey Systems Market
1989



Growth for the entire information services industry was 16% in 1989. The slower than industry growth is tied to:

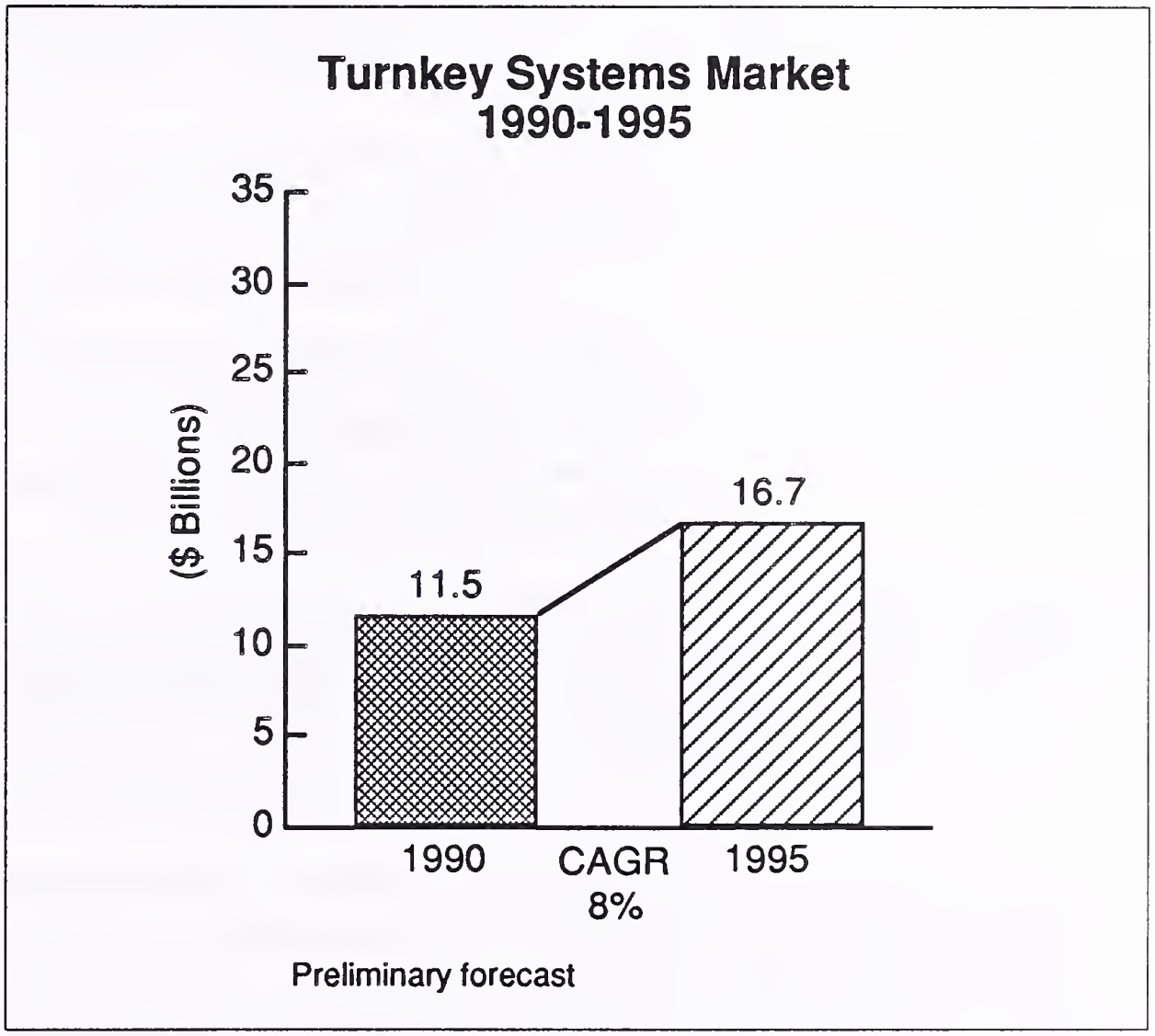
- The level of maturity of the larger turnkey vendors

- The lower unit value of solutions typically sold by the VARs

- The continuing shift in strategy of some turnkey vendors to become applications software products vendors

Over the five-year period from 1990 to 1995, INPUT projects a further decline in the rate of growth to a compound annual growth rate of 8%, as shown in Exhibit IX-2. By 1995, the turnkey systems market will have grown to $16.7 billion.

EXHIBIT IX-2



B

Turnkey Systems Market Trends and Issues

The turnkey systems market continues to undergo measured change. That change started in the middle of the 1980s.

- First, the computer manufacturers, particularly manufacturers of minicomputers, began to change their hardware discount schedules. That resulted in declining product margins.
- Next, the market strengths gained from producing proprietary computing equipment began to decline.
- Third, the market began shifting to the workstation and personal computer level, with inherent lower product values.

Exhibit IX-3 identifies the key forces driving opportunity and growth in the turnkey systems market as it enters the next decade. Exhibit IX-4 identifies contrasting growth inhibitors for this market. The change that has directly impacted this market over the past five years can be expected to continue and even quicken as these positive and restrictive forces take effect.

EXHIBIT IX-3

Turnkey Systems Market Driving Forces

- Open systems architecture
- Alliances
- PC/workstation-based solutions
- Growth of support services requirements
- Consolidation

EXHIBIT IX-4

Turnkey Systems Market Growth Inhibitors

- Shift to software vendor role
- Conflicts in distribution channels
- Price pressure of PC solutions
- Regional market orientation

The steady spread of open systems architecture, driven by UNIX, communications standards, use of SQL as the data base language of choice and the general standardization of the underlying information systems technology, is shifting the focus more and more towards the actual solution—the application software product along with implementation and support services. The positive impacts for VARs include:

- The ability to more easily turn to alternative equipment vendors. The VAR can improve its profit opportunities and have flexibility to meet client preferences for equipment.

- The ability to strengthen staff technical skills by focusing them on preferred standards instead of proprietary technology

- The ability to compete on skills and solution, not hardware and price

VARs and more traditional turnkey systems vendors are finding that computer manufacturers and professional services firms are interested in forming strategic alliances. Over the next few years, alliances can be expected to reach the level of minority investments, similar to those made by computer manufacturers in the applications software area.

- Computer manufacturers are interested in assuring the availability of application software solutions on their platforms, in particular those manufacturers shifting to open systems architectures. The result is favored treatment in joint marketing efforts.

- Professional services firms are interested in maintaining client control and in assuring their ability to offer solutions, not just consulting and systems development services. They need VARs with unique vertical industry application solutions that they can offer to their clients through joint sales and subcontracting relationships.

The ever-increasing power of workstations and personal computers continues to broaden the market for turnkey/VAR vendors. As these computers take on the power of a minicomputer, the level of interest by midsize and smaller businesses in adopting greater computerization grows. This is a segment of the overall market that turnkey vendors/ VARs are best suited to serve.

Increased computerization in turn leads to greater opportunities to sell support services, both during the initial sale of the solution and on an ongoing basis. The modestly sized business remains uninterested in creating an internal data processing function and will favor the vendor who is close at hand and can assure a reasonable level of cost-effective support.

- Though there remains a preference for packaged applications solutions, the declining cost of turnkey products offers an increased opportunity to customize the solution for the customer. With lower-cost products, customization can lead to significant increases in margin for the vendor.

- The use of LANs and multiuser solutions adds a new market for the VAR—network products and services.

With alliances becoming important in this market it is expected that small turnkey/VARs will be under pressure to provide coverage on an extended regional and U.S.-wide basis. Penetrating larger organizations will also create pressure for consolidation. There are already a number of cases in which this is occurring. One example is Evernet, which was founded to create, by acquisition, a nationwide provider of LAN products and services. These plans are already well underway, with Evernet having acquired a number of LAN-oriented VARs during 1990.

Perhaps even more than the other information services industry markets, the turnkey systems market is being negatively impacted by key growth inhibitors, as listed in Exhibit IX-4.

At the top end of this market, vendors continue to shift their underlying strategy from turnkey systems to software products. Interleaf and Metaphor are two recent examples of companies that have found that their application software products are the basis for their market strength, and the delivery of hardware, proprietary or not, with that software is not essential in the markets they serve. In fact, they are turning to VARs themselves to distribute their products in some sectors of their markets.

The interests of computer manufacturers, and the strategies of professional services firms, are all creating conflicts in the distribution channels used by turnkey vendors and, in particular, VARs.

- The discounting confusion that developed over the past few years remains. Equipment manufacturers, in their efforts to gain market share, have caused direct conflict between different levels of the distribution channel.

- Professional services firms, in their rush to provide solutions, are forming alliances with application software, turnkey and VAR vendors. Often these alliances overlap and they assure that the professional services firm will take the lion's share of the customization and implementation services revenue. The turnkey/VAR may be faced with only a low-margin product sale after competing first with the professional services company to use its product, and then with the partner for the actual sale.

- The VAR needs to be sure to what degree its alliances are strategic to its partners.

The shift towards PC-based solutions and services brings with it a decrease in the value of each solution sale. PC application software products, even if they have more function than their minicomputer predecessors, do not carry high value in the market. The cost of sale versus size

of sale challenge is spreading across all levels of the information services industry, but it is no more apparent than in the turnkey/VAR market. Solutions include the bundling of support services and the development of lower-cost marketing methods.

The size of most turnkey/VAR vendors necessitates that they do business on a limited geographical basis. The result is slower growth, conflict in alliances with computer manufacturers who prefer wide market coverage, and competitive problems with the larger VARs. Consolidation will certainly result and will be a positive influence on the strength of this market, but that will take time. In the interim, limited geographical focus will restrict VAR growth and benefit the professional services firms.

C

Leading Turnkey Systems Vendors

Exhibit IX-5 lists leading turnkey systems vendors. This list represents the large turnkey companies, many of which have been in existence for many years and who play a strong role in one or more vertical industry markets. One example is Reynolds & Reynolds, which has long had a leading position in the automotive dealership market.

EXHIBIT IX-5

Leading Turnkey Systems Vendors

- ADP
- Bolt, Beranek & Newman
- Compugraphic
- Computer Consoles
- Gerber Scientific
- HBO and Co.
- Intergraph
- ISC Systems
- Mentor Graphics
- Prime Computer
- Reynolds and Reynolds

The following profiles provide examples of how several vendors are addressing the challenges of the turnkey systems market.

1. Barrister Information Systems Corporation

Founded in 1972, Barrister is an example of a turnkey systems vendor that has focused on a vertical industry—the legal profession—and which has updated its business strategy to take advantage of industry hardware standards.

Today, this $32 million company offers the legal profession systems that run under UNIX, LAN and AS/400 technology.

Implementing a broader technology-based strategy has not been without difficulty. In 1989, the shift to microcomputer from minicomputer-based products negatively impacted revenues, and the focus on UNIX has increased development costs and delayed new product availability.

At the same time, the strategy shifts Barrister has made are typical of those being made by many turnkey/VAR vendors to position themselves for the 1990s.

2. Delphi Information Systems, Inc.

Delphi was founded in 1976 to provide turnkey systems to independent agents and brokers in the property and casualty insurance industry.

Delphi's strategy employs and benefits from a number of the key trends in the turnkey market. It is forming alliances, utilizing industry standard systems software, and staying focused in a single vertical industry. At they same time, it is being impacted by the growth inhibitors discussed earlier.

- It has formed an alliance with CIGNA to deliver automation systems to CIGNA agents and brokers, an example of using a large company's sponsorship to provide access to a large prospective client group.

- It now offers its products on multiple UNIX-based multiuser workstations, giving it product portability.

At the same time, it has been impacted by lower-priced systems, resulting in flat sales for the past four years.

3. Gerber Scientific, Inc.

Gerber Scientific is an example of a larger, more traditional turnkey systems vendor, with revenues around $300 million. Its market is CAD/CAM systems supporting a number of industries.

Gerber has built its turnkey business by adapting its CAD/CAM technology to a number of specialized applications for the apparel, aerospace, automotive, footware, furniture, and other industries. In some industries its systems are applied to a number of the manufacturing processes for the industry's products. Vertical application expansion within an industry has proven to be a strategic strength for Gerber.

Gerber has also built a significant business in graphics arts application areas, which accounts for over one-third of its business.

4. Intergraph

Intergraph is perhaps the largest turnkey systems vendor in the U.S. today. It represents a full turnkey vendor building proprietary hardware and software for interactive graphics systems.

Intergraph's success in building specialized workstations to support its applications software products has resulted in the creation of a separate division that is selling these workstations on an unbundled basis.

Its application software products drive turnkey systems sales in architectural and engineering design, civil engineering, mechanical design, electrical and electronics design, electronic publishing, geographic information systems, mapping, utilities and more. Whereever basic graphics capabilities are required, Intergraph has been able to adapt its underlying software/hardware technology to develop a somewhat specialized application.

Intergraph remains one of the few turnkey vendors that retains a high dependence on its own proprietary hardware.

5. Terrano Corporation

Terrano is a value-added reseller (VAR) for Prime and IBM AS/400 computers, concentrating on clinical laboratory and radiology applications for the health care industry.

Starting with the development of a complete hospital information system, Terrano shifted strategy in the mid-1980s to focus on the specialized requirements of medical laboratory application systems. In the last three years Terrano has enjoyed significant growth, countering negative growth in 1985 and 1986.

Terrano represents a successful implementation of a VAR strategy based on a specialized niche area. It has been able to expand its business to a majority of the states in the U.S. and retain a full turnkey sales objective.

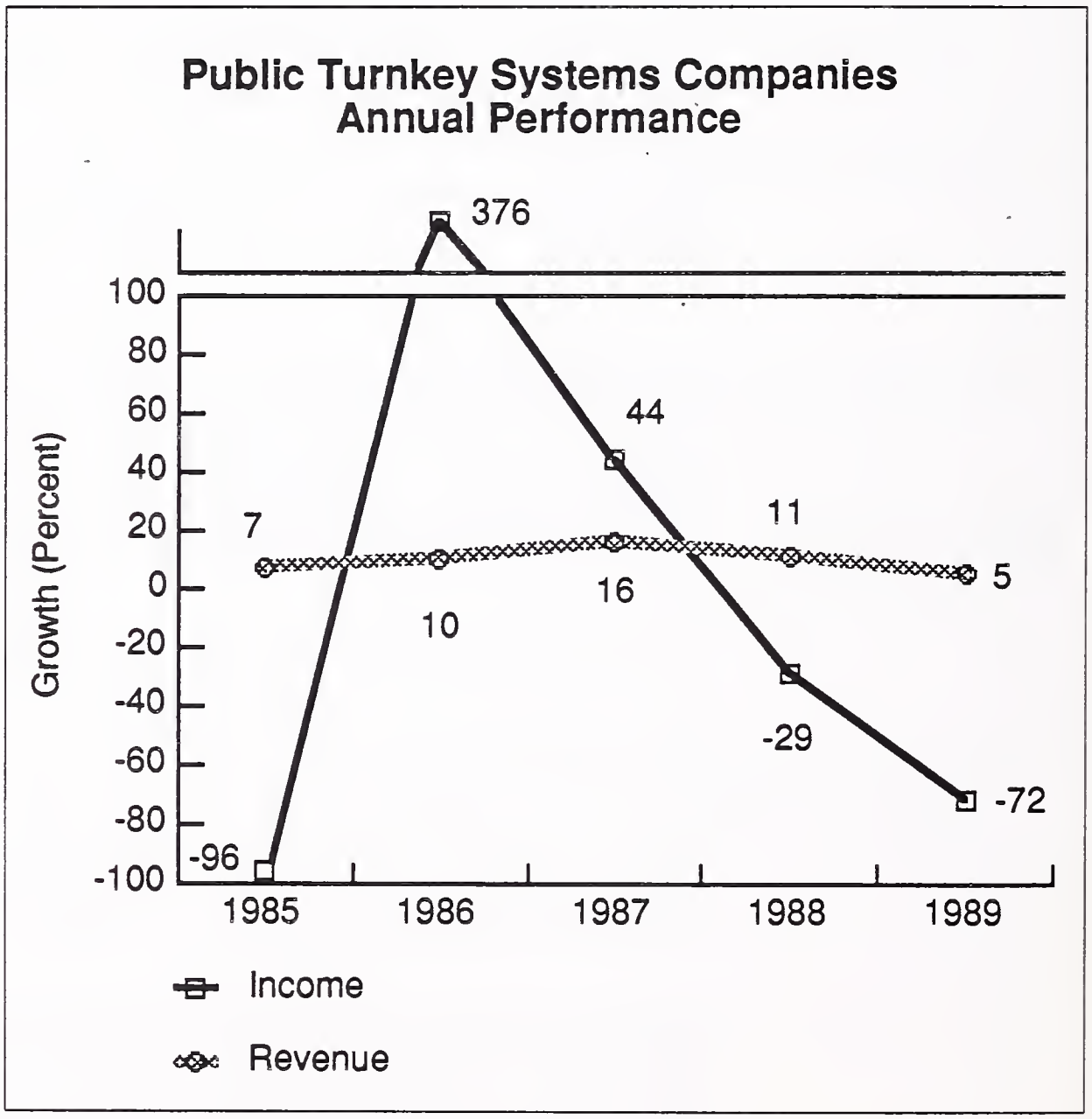
D

Public Turnkey Systems Company Performance

1. 1989 Performance

As shown in Exhibit IX-6, revenue growth for turnkey systems vendors has been moderate to low during the past five years. Revenue grew 5% for the turnkey systems vendors in 1989, compared to 11% in 1988 and 16% in 1987. The most significant contributors to the growth in 1989 were ASK Computer Systems, Cerner, Gerber Scientific, and Interleaf. Interleaf's results have been included in the turnkey systems segment of this report. However, in late 1989, the company announced it would be exiting the turnkey systems business and focusing on providing software and services.

EXHIBIT IX-6



Earnings growth for the turnkey systems group has been somewhat volatile during the past five years. In 1989, earnings fell 72% from the prior year, due to losses incurred primarily by C3, Daisy Systems, and Interleaf.

In 1989, profitability for the turnkey systems group ran below the average for information services vendors overall. The group earned 1.2% on the revenues it generated.

Exhibit IX-7 provides revenue and net income results by company.

Avant-Garde was removed from the list of public turnkey systems vendors because it was acquired by Boole & Babbage. Computer Consoles was removed because it was acquired by STC PLC. ISC Systems was also removed because it was acquired by Olivetti.

EXHIBIT IX-7

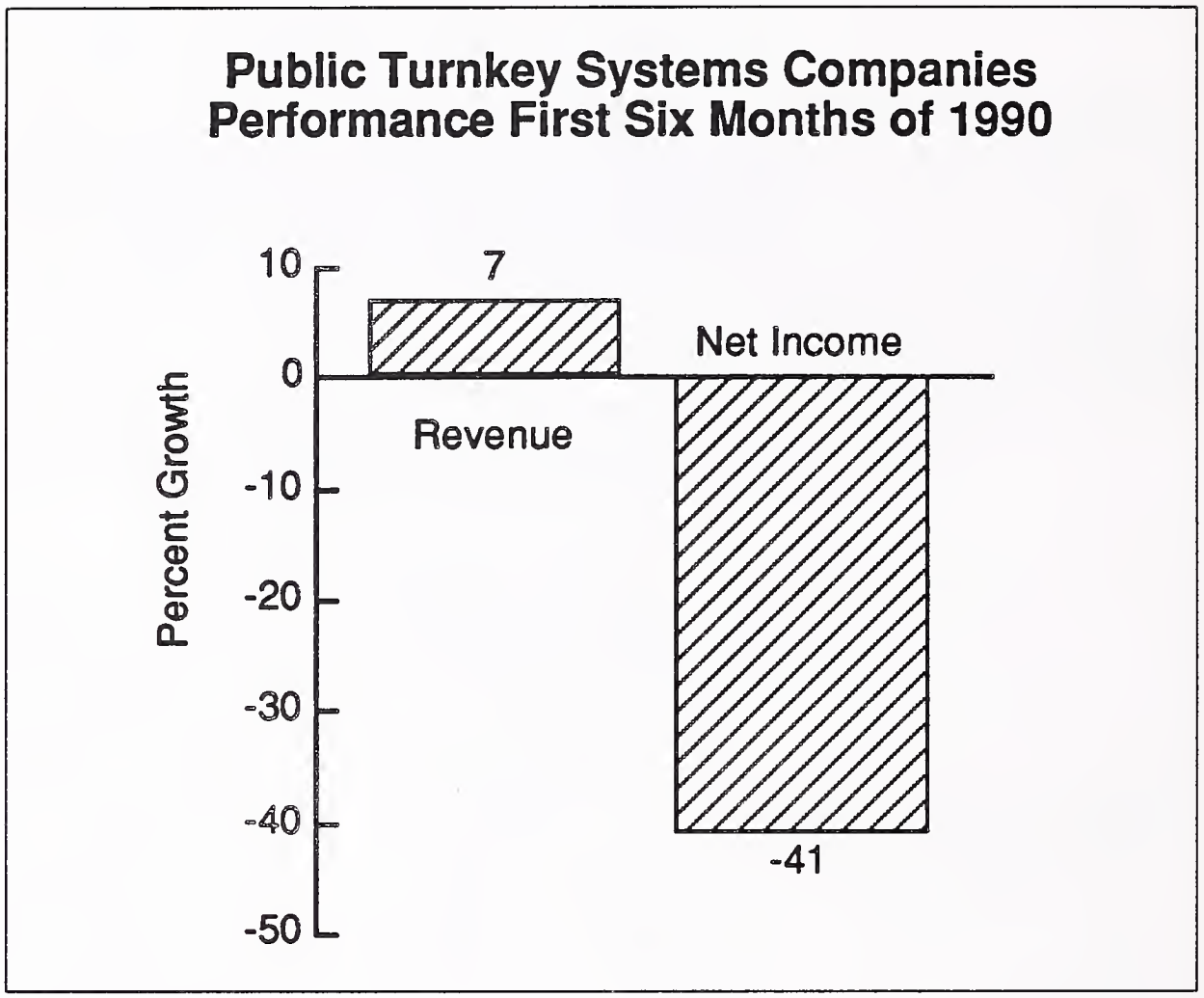
Public Turnkey Systems Companies Performance
Revenue and Net Income

Company Name	Revenue			Net Income		
	1988 ($ Millions)	1989 ($ Millions)	% Change	1988 ($ Millions)	1989 ($ Millions)	% Change
ASA INTERNATIONAL	19.3	23.8	23	-0.5	0.5 [1]	200
ASK COMPUTER SYS.	168.3	189.6	13	12.2	9.3	-24
AUTO-TROL TECH.	74.3	76.9	3	1.5 [2]	-4.4 [4]	-393
BARRISTER INFO.	33.5	31.0 [5]	-7	-4.6 [3]	-7.1 [6]	-54
C3	70.8	57.6	-19	1.6	-19.3	-1,309
CERNER	40.9	56.7	39	3.5	3.6	3
COMPTEK RESEARCH	50.9	47.4	-7	0.4	1.2	200
COMPUTRAC	12.3	13.4	9	1.9 [7]	1.8	-5
DAISY SYSTEMS	121.4	113.3 [8]	-7	-61.7	-93.3 [9]	-51
GERBER SCIENTIFIC	288.4	306.1	6	31.7	33.2	5
HBO	187.4	203.6	9	12.5	15.5	24
INTERGRAPH	800.2	860.1	7	88.0 [10]	79.5 [11]	-10
INTERLEAF	74.9	114.8	53	2.7	-15.6 [12]	-678
REYNOLDS & REYN.	612.2 [13]	591.9 [14]	-3	21.9	26.3	20
TERRANO	3.7	4.9	32	0.3	0.4	33
TRIAD SYSTEMS	136.3	148.9	9	10.2	2.7 [15]	-74
Total	2,694.8	2,840.0	5	121.6	34.3	-72

2. The First Six Months of 1990

As shown in Exhibit IX-8, revenue for the public turnkey systems vendors grew 7% during the first six months of 1990 as compared to the same period in 1989. The most significant contributors to the growth were ASK Computer Systems, Intergraph, and C3.

EXHIBIT IX-8



Earnings for this group of vendors fell 41% from the prior year period, due primarily to continued losses incurred by C3 and earnings declines for ASK Computer Systems, Gerber Scientific, and Intergraph. Profitability for the group was 3.7% for the first half of 1990, compared to 6.7% for the first half of 1989.

Interleaf has been removed from the list of public turnkey systems vendors because of its announcement late in 1989 that it was exiting the turnkey systems business to focus on software and services. Daisy Systems also was removed because it is involved in bankruptcy proceedings.

3. Footnotes

1. ASA International's 1989 results include a $203,000 benefit of net operating loss carry-forward.

2. Auto-Trol's 1989 results include inventory write-downs of $688,000 (resulting from supplier price declines) and a charge to income of $988,000 resulting from a write-off of the remaining book value of certain capitalized software.

3. Barrister's 1988 results include tax and accounting credits of $1.4 million.

4. Barrister's 1989 results include an inventory write-down of $1.2 million.

5. C3's 1989 results were attributed to a drop in orders under C3's GSA schedule contract and insufficient new orders.

6. C3's 1989 losses include interest expenses of over $12 million associated with loans used to finance the C3 acquisition by Knoll Capital Management L.P.

7. CompuTrac's 1988 results include a tax credit of $434,000 from the cumulative effect of a change in accounting for income taxes.

8. Daisy Systems' 1989 results include the operations of Cadnetix Corporation, which was acquired effective December 31, 1988.

9. Daisy Systems' 1989 results include a loss of $32.2 million resulting from the write-off of good will attributed to the sale of HHB Systems, Inc. in May 1989.

10. Intergraph's 1988 results include exchange and translation losses of $2.2 million.

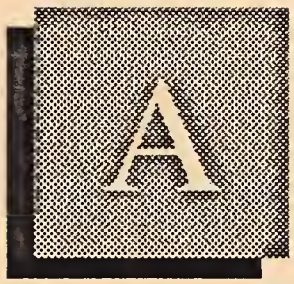
11. Intergraph's 1989 results include $13.5 million in pretax gains on the sale of long-term investments, including a $12 million pretax gain from the exchange of its ownership interest in Tangent Systems for shares of Cadence Design Systems common stock in March 1989. Earnings were also impacted by market pricing and higher operating expenses.

12. Interleaf's 1989 results include a one-time, $13.5 million after-tax restructuring charge as a result of the company's decision (announced in November 1989) to exit the turnkey systems business and focus on providing software and services.

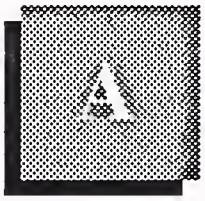
13. Reynolds' 1988 results were restated to reflect the adoption of a change in the method of accounting for majority-owned subsidiaries.

14. Reynolds' 1989 results exclude businesses sold during 1988, which contributed $21.9 million to fiscal 1988 revenue.

15. Triad's 1989 results include nonrecurring charges of $7.4 million (including $6.5 million incurred in connection with an offer by Volt Information Sciences to purchase Triad and the resulting litigation and costs for preliminary refinancing), less a $5.8 million pretax gain from the sale of real estate.



Appendix: Definition of Terms



Appendix: Definition of Terms

A
Overall Definitions and Analytical Framework

Information Services - Computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Processing of specific applications using vendor-provided systems (called **Processing Services**)
- A combination of hardware, packaged software and associated support services which will meet a specific application processing need (called **Turnkey Systems**)
- Packaged software (called **Software Products**)
- People services that support users in developing and operating their own information systems (called **Professional Services**)
- Bundled combinations of products and services where the vendor assumes responsibility for the development of a custom solution to an information system problem (called **Systems Integration**)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called **Systems Operations**)
- Services associated with the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange, on-line data bases, on-line news and data feeds, videotex, etc. (called **Network Services**)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is bundled as part of an overall service offering such as a turnkey system, a systems operations contract, or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., EDI or VAN services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the **Information Services Industry** consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels, and competitive issues.

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the eight delivery modes defined by INPUT, five are considered primary products or services:

- *Processing Services*
- *Network Services*
- *Professional Services*
- *Applications Software Products*
- *Systems Software Products*

The remaining three delivery modes represent combinations of these products and services, bundled together with equipment, management and/or other services:

- *Turnkey Systems*
- *Systems Operations*
- *Systems Integration*

Section B describes the delivery modes and their structure in more detail.

Outsourcing is defined as the contracting of information systems (IS) functions to outside vendors. Outsourcing should be viewed as the opposite of *insourcing*: anything that IS management has considered feasible to do internally (e.g., data center operations, applications development and maintenance, network management, training, etc.) is a potential candidate for outsourcing.

IS has always bought systems software, as it is infeasible for companies to develop it internally. However, all other delivery modes represent functions or products that IS management could choose to perform or develop in-house. Viewed this way, outsourcing is the result of a

make-or-buy decision, and the outsourcing market covers any product or service where the vendor must compete against the client firm's own internal resources.

B

Industry Structure and Delivery Modes

1. Software Products

There are many similarities between the applications and systems software delivery modes. Both involve user purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Vendor-provided training or support in operation and use of the package, if bundled in the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

- **Systems Software Products**

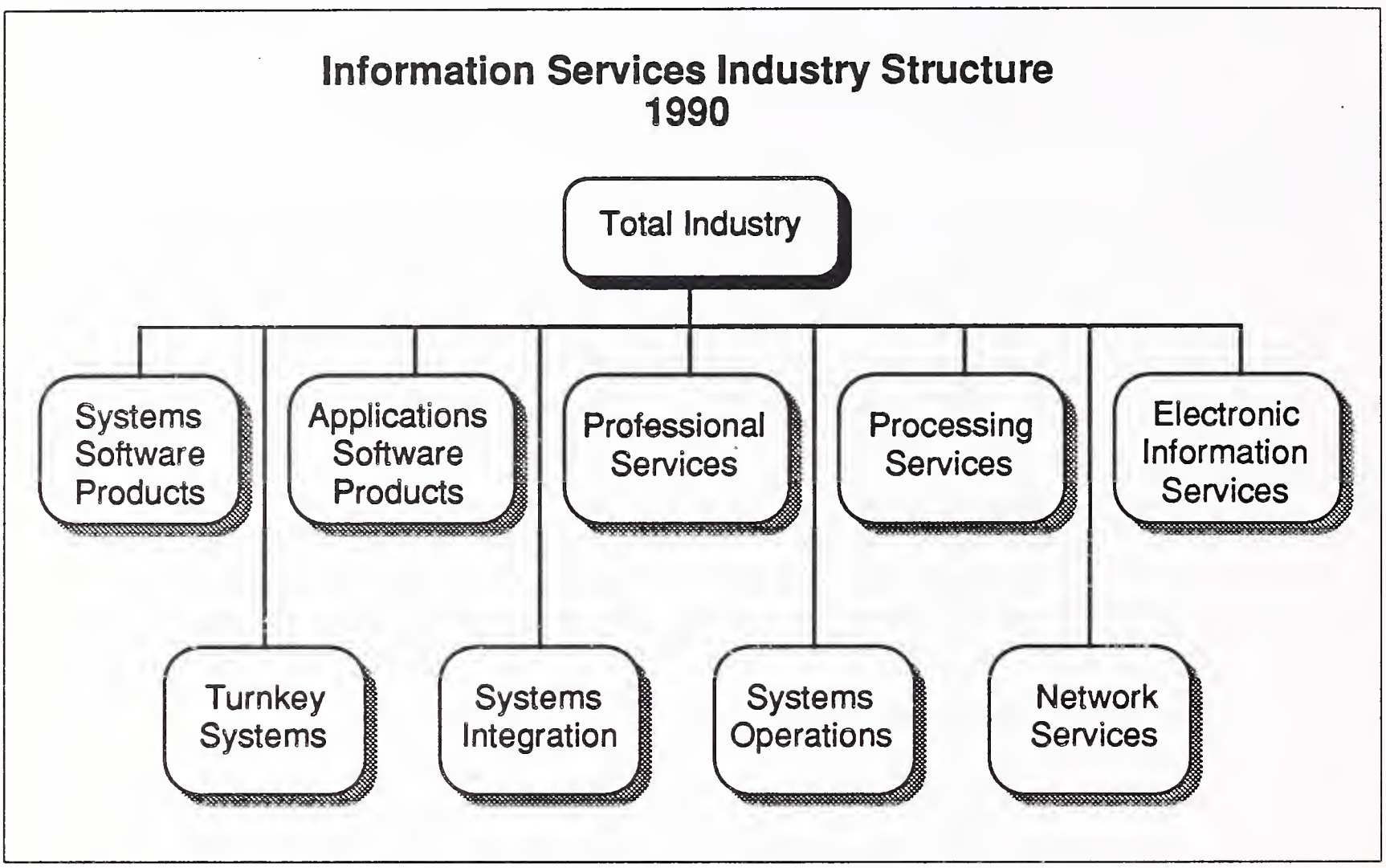
  Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. These products include:

  - *Systems Control Products* - Software programs that function during application program execution to manage computer system resources and control the execution of the application program. These products include operating systems, emulators, network control, library control, windowing, access control, and spoolers.

  - *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities, and capacity management.

  - *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, data base management systems, report writers, project control systems, CASE systems and other development productivity aids. Also included are system utilities (e.g., sorts) which are directly invoked by an applications program.

EXHIBIT A-1



- **Application Software Products**

  - *Industry-Specific Application Software Products* - Software products that perform functions related to solving business or organizational needs unique to a specific vertical market and sold to that market only. Examples include demand deposit accounting, MRPII, medical recordkeeping, automobile dealer parts inventory, etc.

  - *Cross-Industry Application Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Applications include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

2. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom application software into a single system developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and support services provided. Most CAD/CAM systems and many

small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialized hardware such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

- *Value-Added Reseller (VAR):* A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually application software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services.

Turnkey systems are divided into two categories.

- *Industry-Specific Systems* - systems that serve a specific function for a given industry sector, such as automobile dealer parts inventory, medical recordkeeping, or discrete manufacturing control systems.
- *Cross-Industry Systems* - systems that provide a specific function that is applicable to a wide range of industry sectors, such as financial planning systems, payroll systems, or personnel management systems.

3. Processing Services

This category includes transaction processing, utility processing, and other processing services.

- *Transaction Processing:* - Client uses vendor-provided information systems—including hardware, software and/or data networks—at vendor site or customer site, to process transactions and update client data bases. Transactions may be entered in one of four modes:

  - *Interactive* - Characterized by the interaction of the user with the system for data entry, transaction processing, problem solving and report preparation: the user is on-line to the programs/files stored on the vendor's system.

  - *Remote Batch* - Where the user transmits batches of transaction data to the vendor's system, allowing the vendor to schedule job execution according to overall client priorities and resource requirements.

- *Distributed Services* - Where users maintain portions of an application data base and enter or process some transaction data at their own site, while also being connected through communications networks to the vendor's central systems for processing other parts of the application.

- *Carry-in Batch* - Where users physically deliver work to a processing services vendor.

- *Utility Processing*: Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), generic applications programs and or data bases, enabling clients to develop their own programs or process data on vendor's system.

- *Other Processing Services*: Vendor provides services—usually at vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

4. Systems Operations

Systems operations involves the operation and management of all or a significant part of the user's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes:

- *Professional Services:* The vendor provides personnel to operate client-supplied equipment. Prior to 1990, this was a submode of the Professional Services delivery mode.

- *Processing Services:* The vendor provides personnel, equipment and (optionally) facilities. Prior to 1990, this was a submode of the Processing Services delivery mode.

In the federal government market the processing services submode is called "COCO" (Contractor-Owned, Contractor-Operated), and the professional services mode is referred to as "GOCO" (Government-Owned, Contractor-Operated).

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the user's information systems (equipment, networks, systems and/or application software), either at the client's site or the vendor's site. Systems operations can also be referred to as "resource management" or "facilities management."

There are two general levels of systems operations:

- *Platform/network operations* - where the vendor operates the computer system and/or network without taking responsibility for the applications

- *Application operations* - where the vendor takes responsibility for the complete system, including equipment, associated telecommunications networks, and applications software

Note: Systems Operations is a new delivery mode introduced in the 1990 MAP Program. It was created by taking the Systems Operations submode out of both Processing Services and Professional Services. No other change has been made to the delivery mode definitions, and the total forecast expenditures for these three delivery modes are identical to the total forecast expenditures of the two original modes before the breakout of Systems Operations.

5. Systems Integration (SI)

Systems Integration is a business offering that provides a complete solution to an information system, networking or automation requirement through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price.

To be included in the information services market, systems integration projects must involve some application processing component. In addition, the majority of cost must be associated with information systems products and/or services.

The systems integrator will perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management

- Needs analysis

- Specification development

- Conceptual and detailed systems design and architecture

- System component selection, modification, integration and customization

- Custom software design and development

- Custom hardware design and development

- Systems implementation, including testing, conversion and post-implementation evaluation and tuning

- Life cycle support, including
  - System documentation and user training
  - Systems operations during development
  - Systems maintenance

- Financing

6. Professional Services

This category includes consulting, education and training, and software development.

- *Consulting:* Services include management consulting (related to information systems), information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of information systems, including equipment, software, networks and systems operations.

- *Education and Training:* Products and services related to information systems and services for the professional and end user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation.

- *Software Development:* Services include user requirements definition, systems design, contract programming, documentation and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

7. Network Services

Network services typically include a wide variety of network-based functions and operations. Their common thread is that most of these functions could not be performed without network involvement. Network services is divided into two major segments: *Electronic Information Services,* which involve selling information to the user, and *Network Applications,* which involve providing some form of enhanced transport service in support of a user's information processing needs.

- *Electronic Information Services*

  Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the data bases. Although users may load extracted data into their own computer systems, the electronic information vendor provides no data processing or manipulation capability and the users cannot update the vendor's data bases.

  The two kinds of electronic information services are:

  - *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.

  - *News Services* - Unstructured, primarily textual information on people, companies, events, etc.

  While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

- *Network Applications*

  - *Value-Added Network Services (VAN Services)* - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

    While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

    INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers.

  - *Electronic Data Interchange (EDI)* - Application-to-application exchange of standardized business documents between trade partners or facilitators. This exchange is commonly performed using VAN

services. Specialized translation software is typically employed to convert data from organizations' internal file formats to EDI interchange standards; this software may be provided as part of the VAN service, or may be resident on the organization's own computers.

- *Electronic Information Exchange (EIE)* - Also known as Electronic Mail (E-Mail), EIE involves the transmission of messages across an electronic network managed by a services vendor, including facsimile transmission (FAX), voice mail, voice messaging, and access to Telex, TWX, and other messaging services. This also includes bulletin board services.

- *Other Network Services* - This segment contains videotex and pure network management services. Videotex is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. These services provide interactive access to data bases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, and more.

  Network management services included here must involve the vendor's network and network management systems as well as people. People-only services, or services that involve the management of networks as part of the broader task of managing a user's information processing functions are included in Systems Operations.